“THE FAR EASTERN REVIEW” – CHINESE RAILWAY CONSTRUCTION

A COMPREHENSIVE STUDY OF HISTORICAL REFERENCES WITHIN THE LIFE OF THIS JOURNAL OF THE DEVELOPMENT & CONSTRUCTION OF CHINA’S EARLY RAILWAYS, INCLUDING EXTRACTS OF RELEVANT PAGES **(SECTION 9 of 14)**

For Introduction please see preface to Volumes I - V

(Note : to view the relative pages of the magazine, scroll down to end of these notes for each volume, respectively)

Volume XXIII

Note: In this volume G.B. Rea continues with a Japanese-eccentric journal, heavy on political commentary and with fewer articles about engineering projects. The useful “Engineering Notes” at the rear of each monthly number are absent or limited in scope except for November and December.

January 1927

Building Bridges Under Traffic on the Kiao-Tsi Line an illustrated article by F.K. Sah, Engineer-in-Chief of the Kiaochow-Tsinan Railway about replacing old bridges with Concrete Slabs, taking only 89 Minutes.

Amoy-Changchow Railway. The Ministry of Communications had appointed a commission of four railway experts, to make an estimate of the assets of the Amoy-Changchow Railway to enable calculations to be made concerning compensation for private shareholders.

February 1927

Engineering Feats in Kwantung A summary of the railway & other engineering accomplishments made in the Japanese leased territory of Kwantung (including the S.M.R. zone) following the Russo-Japanese War.

Development of Through Traffic on the Chinese Government Railways A summary of the through-traffic arrangements made on Chinese railways in the previous few years. 1 photo of Peking station.

Refrigeration Car Service on Chinese Government Railways Short description of 21 refrigeration cars ordered from Belgium, together with their allocation. 1 photo.

Taonanfu-Tsitsihar Railway A report that Anganchi section of the Taonanfu-Tsitsihar line had been completed.
Railways in Fukien . A report that a group of wealthy overseas Fukienese planned to take over the Changchow-Amoy Railway and also build a line between Foochow and Amoy.

March 1927
The Peking-Mukden Railway Workshops An illustrated description of the Tongshan railway workshops and their importance to the Chinese government system.
The Yunnan-Koppei Railway E. P. Williams, Jr., of the Baldwin Locomotive Company describes the line built for the tin mines and Davenport & Baldwin locomotives on the line. 8 photos and one sketch map.
Shanghai-Chuansha Light Railway Company The company had launched services on 5 November 1926.

April 1927
Fairbanks-Morse Railway Specialties Advertisement for railway equipment including water cranes.
Extension of Chinese Railways Proposed. It had been decided to extend the Mukden-Hailungcheng Railway, then under construction, to Kirin.
Hulan-Hailun Railway. The railway in Heilungkiang province, had formally opened to traffic on 23rd. January with traffic as far as Suihwa.

May 1927
Bethlehem Specialities for Steam Railways Advertisement for Bethlehem steel rails and associated equipment.
Bases for New Railways Manchuria Article by C. Walter Young describing the relationship between new railways in Manchuria and the economic development it brought. 2 sketch maps.
The South Manchuria Railway Introduction to a new book about the railway written by W. H Kinney

June 1927
Economic Conditions Along Taonan-Angangki Railway Summary of trade and freight traffic along this line.
Direct. Railroad Communication, Berlin-Peking Through tickets had recommenced between Berlin and Peking (having stopped in 1914) .
Railway Engineering Works in Kirin With a view to securing contracts for railway construction Chinese and Japanese had organized the Kirin Hing Yeh Railway Engineering Works.

July 1927
Mukden-Hailung Railway. Report that this running from outside the North Gate of Mukden city had been opened as far as Tsingyuan. The whole line was to be is over five hundred li in length.
Mukden-Hailung Railway. A report that traffic as far as Pehshanchengchen had opened from 1st. May

August 1927
The Reinforced Concrete Sleeper A technical article by H. Stringer, B.A., A.M.I.C.E., Late Resident Engineer, Peking-Mukden Railway describing concrete sleepers used on the PMR.
Communications in China Article describing transport in China. 1 photo showing the Shanghai-Nanking Railway at Nanking

Kiaochow-Tsinan Railway.- A table showing the yearly averages of freight and passengers carried during the three stages of the Kiaochow-Tsinan Railway, under German, Japanese and Chinese management.
Kirin-Hailung Railway.- General description of construction history of this line which had formally started on 25th June. The whole line was expected to be completed in the summer of 1929.

September 1927
Tennessee Railroad Materials Advertisement for steel rails and tie plates.
The Chinese Eastern Railway in 1926 General description of the railway as matters then stood. Traffic figures and other statistics provided for years 1922-1926. 3 photos.
Liu Chang Coal Mining & Railroad Co. A profit of $110,000 had been realized for the year ended March 1927
Kiao Tsi Bridge. A new bridge at Km.14 on the Kiao-Tsi
Railway spanning the Li-Tsun-Ho had been opened to traffic on 25th May

October 1927
The Development of Manchuria A series of articles about Mr. J Yamamoto, President of the South Manchuria Railway Company as well as their Vice-President, Y Matsuoka. 2 photos.
Mining in Anhwei Short summary of the operations of the Anhwei Govt Mining Administration's three mines. A light railway connected the Shuitang mine near Suanchen (Xuancheng 宣城) with Shwangkiao (双沟 ?), on the Neiho. It had two light locomotives, 20 5-ton coal-cars, and six third class passenger-cars. The other two mines had only push cars on 2ft tracks

November 1927
Our Pacific Communications An editorial by the G. B. Rea about Pacific Communications. A short section about past failures of American businesses to enter the Chinese railway construction scene because of international and domestic politics.
The Depreciation of Rolling Stock. Another article by H Stringer, this one comparing how Chinese and other country's railways depreciate their rolling stock assets.
British-Built Coaching Stck for Imperial and Foreign Railways Desription of rolling stck built for overseas railways (no specific mention of China).
Engineering Reports
The Chinese Eastern Railway Co. had decided to
install radio receiving sets in the residences of the more important
staff members and directors, as well as in the offices of the railway administration.
Tientu Railway A report that the line had had a bad year in 1926.
New Construction in Manchuria. A new railway engineering works had been opened in Kirin with a capital of Yen 10 million. Also reported that It had been decided to construct a railway from Hailung to Kirin.
Chinese Eastern Railway Figures for traffic during 1926
Purging the Chinese Eastern Railway of Communists. A report was circulating that Marshal. Chang Tso-lin would seize the Chinese Eastern Railway and eject Soviet representatives.
Increase of Rates and Fares on Kiaochow-Tsinan Line. Fares had been increased. The Shanghai-Nanking Line was also contemplating increases
Peking-Hankow Railway. The Northern Section of the line had much improved within the last few months .

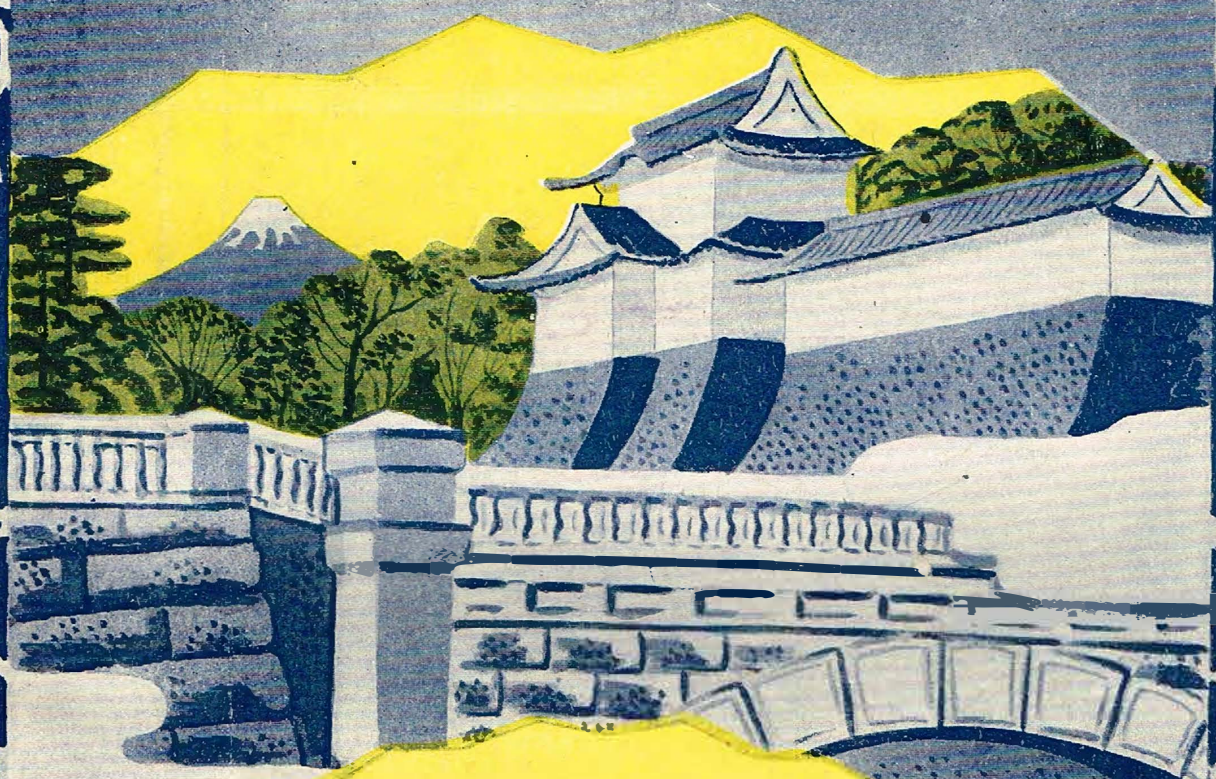
Yellow River Bridge Repairs to the damaged Yellow River Bridge had been completed.
Rolling-Stock on the Government Railways. Latest statistics compiled by the Ministry of Communications for various railways.
Return of Armoured Cars to the Tientsin-Pukow Line. The armoured cars captured by the Nationalists had been returned to the Tientsin-Pukow Line
The Mukden- Hailung Railway had been opened for traffic on 3rd September as far as Tsingyuan.
Route of Ssu-Tao Railway Extension Altered The extension north of Taonan to Gokiol of the Ssupingchieh-Taonan Railway was being re-surveyed with a view to shortening the length.
Fengtien The province was raising capital to build a light railway from Kungchuling to Itungchow a distance of 30 miles.
Section of Kirin-Tunhwa Line Completed. The first section of the Kirin-Tunhwa Railway has been completed and would be opened to traffic on and from 1st. October 1927.
Harbin-Fuyu Railway Contemplated. The Fengtien provincial authorities had decided to build another line between Harbin and Fuyu thus linking up with the Taonan-Fuyu branch.
Taonan-Tsitsihar Railway. Reported that arrangements had been made to have the Taonan-Angangchi Railway extended to Tsitsihar by an elevated track over the Chinese Eastern Railway.
Chinese Eastern Railway. C.E.R. traffic statistics showing an increase in freight carried during 1926.

December 1927
Kirin To Wuchang Project. Local gentry at Kirin and Wuchang were planning to build a railway from Kirin city to Wuchang, a distance of about 400 li.
Ssupingkai-Taonan Line. The Ssupingkai-Taonan Railway was constructing its own terminal station and engine shed at Ssupingkai.
Taolu-Takata Light Rail Extension. The Kaiyuan-Taolu Light Rail Line Co. (Manchuria) proposed to extend the line by about 40 kilometres from Taolu (Hsifeng) to Takata (Hsian).
Sinminfu-Mukden Section of Peking-Mukden Rly. A Japanese loan of Y.320,000 made 18 years previously for this line had been fully repaid.
Taonan-Tsitsihar Railway. The Chinese Eastern Railway Administration, which had strongly opposed the extension of the Taonanfu-Tsitsihar Railway from Angangki to Tsitsihar, had withdrawn its objections.
To Double-Track Peking-Mukden Railway.- The PMR was planning to double-track the line in order to facilitate traffic. Work was to be completed in three stages
Kaitung-Fuyu Project.- The Chinese authorities who were planning to build a railway between Kaitung to Fuyu on the Ssupingkai-Taonan Line had sent a survey party to plan the route.
Kirin-Tunltua Railway.- The Kirin-Liutaohotzu section of the new railway being built from Kirin to Tunhua had opened to provisional traffic 15th. October.

/ continued on page 179

Pericle A. Chien

THE FAR EASTERN REVIEW



IN MEMORIAM
YOSHIHITO
1912 — 1926
EMPEROR
OF
JAPAN

東遠 時報

Vol. XXIII No. 1 JANUARY, 1927

Building Bridges Under Traffic on the Kiao-tsi Line

Replacing Old Bridges with Concrete Slabs in 89 Minutes

By F. K. Sah, Engineer-in-Chief, Kiaochow-Tsinan Railway*

THE Kiaochow-Tsinan Railway has approximately 800 small bridges of 1 m. to 10 m. spans which are being replaced by concrete slabs. The principal reason for this replacement is due to the change of loading. The loading for the original bridges was only equivalent to about Cooper E-25, whereas locomotives of E-35 have been running on this line even before the railway was taken back by China in 1923. It was imperative that the bridges of the Kiaochow-Tsinan Railway be changed as speedily as possible to heavier loading for the safety of traffic and to meet the changing conditions.

*Oriental Engineer.

The New Bridges

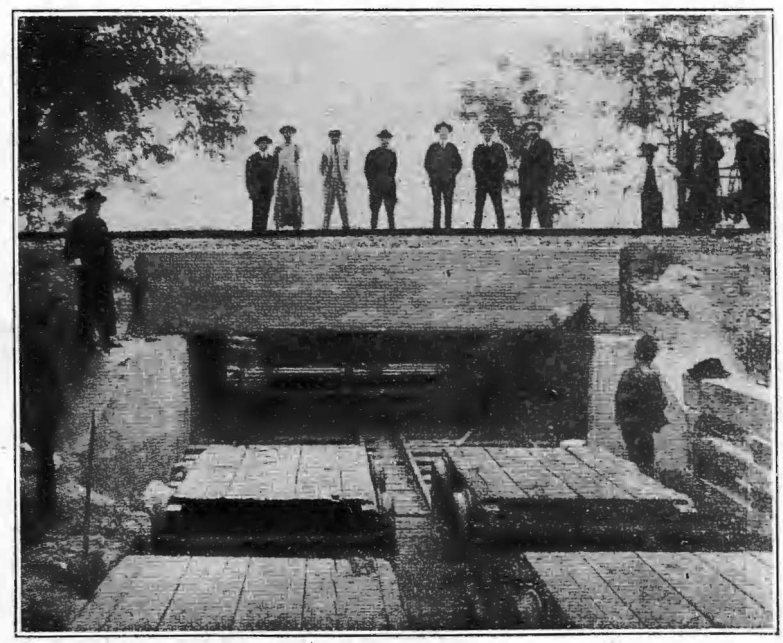
Accordingly all new bridges that are being erected are designed with a loading of Cooper E-50. Of the above mentioned 800 short spans about 50 per cent are of two meter span or less.

The concrete slabs are of four different types of reinforcement, viz. I-beams, channels from old bridges, old rails, and steel rods. The I-beams, channels, or rails in each case are figured to carry the whole load while the concrete is only for protection. Those slabs which can be handled by a crane are cast in the Engineering Department Concrete Casting Yard at Szefang, then shipped to site

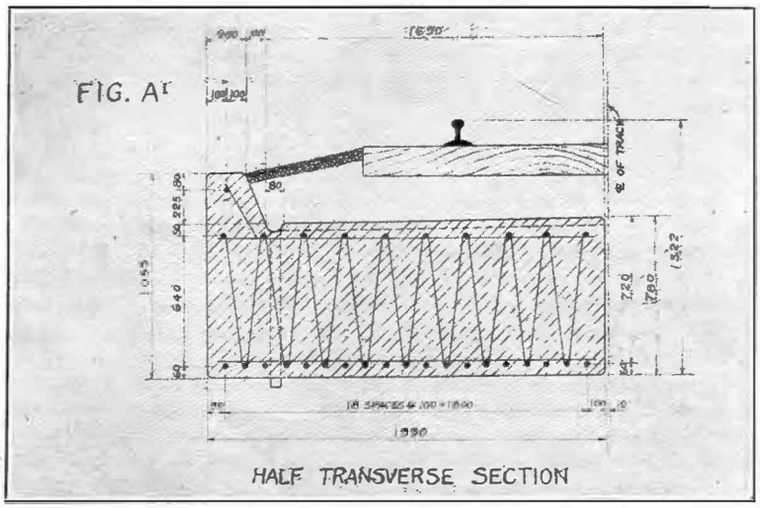
1.00 p.m. Ready to Remove the Track and Old Bridge

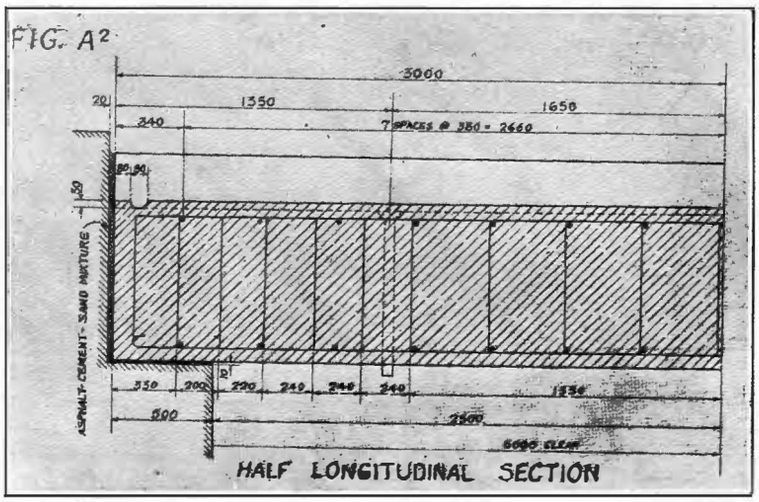
1.12 p.m. Old Bridge Shifted

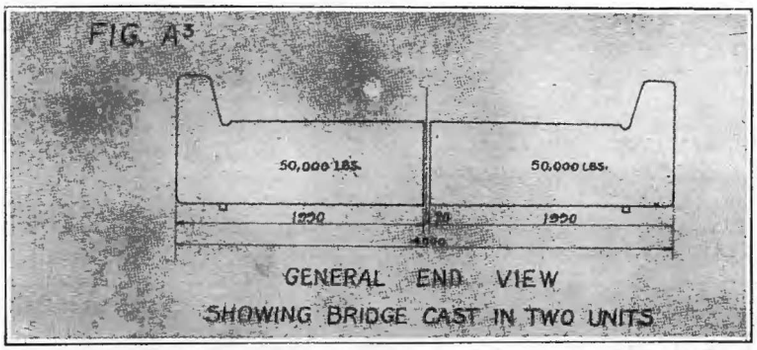
2 p.m. Ballasting

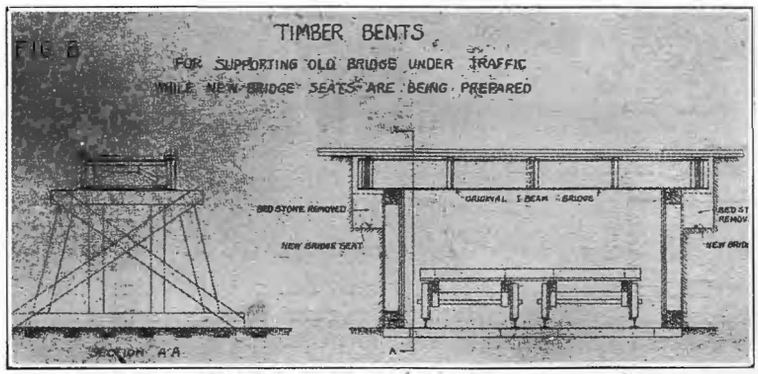


2.29 p.m. All Ready for Train to Pass Over









and erected by locomotive crane. Spans weighing under 15 tons are cast whole, while those over 15 tons are cast in two units, being divided along the center line of track. In case one unit weighs over 20 tons the slabs are cast along side of the bridge site as was the case described in the following. Our locomotive crane has a maximum capacity of 30 tons at five feet radius, so that in this case where one unit weighed nearly 25 tons, the locomotive crane could not be used with safety and the method of erection was adopted which is shown in successive steps by Figs. B, C and D.

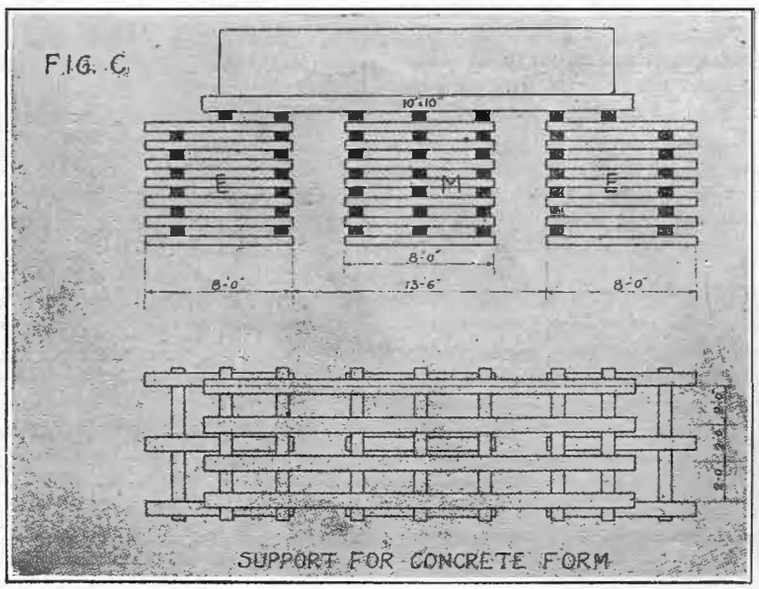
Erected Under Traffic

On June 9th 1926, a standard 5-meter concrete slab bridge was successfully erected under traffic at Km. 22 plus 253. On account of difficulty in getting I-beams of the required length at the time, the steel rod reinforcement type was selected for this particular bridge as shown in Fig, A. As a rule it is more preferable to use the I-beam, channel or old rail type because the steel rod reinforced concrete slab requires greater skill in casting. It is to be noted that one unit of this bridge weighed 50,000 lbs. The two units were cast on forms resting on piers of built up sleepers as shown by Fig. C, the bottom of the concrete forms being of slightly higher elevation than the bridge seats. The age of the concrete slabs was six weeks at the time of erection.

Process of Erection

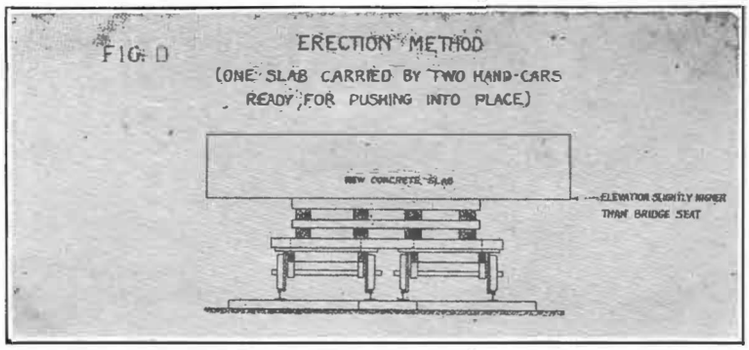
As there was a difference of about one-half meter in elevation between the old and new bridge seats, timber bents were used to support the old bridge temporarily while the new bridge seats were being prepared. These timber bents, (see Fig. B) carried the entire bridge while traffic was going on and while the old bridge seats were dug out and new bridge seats concreted in.

The next step in the erection was to transfer the slabs to the hand-cars which run on tracks in the bridge channel. From the position shown by Fig. C the slab is first raised by jacks to allow the removal of the 10" x 10" beams and the top layer of sleepers of the middle pier M, then the slab is lowered until it is supported by the two end piers E. The middle pier M can now be removed to make room for the laying of the two tracks for the hand-cars which are pushed in under the slabs. Each pair of hand-cars is bolted together to receive one unit. Sleepers are built up on the hand-cars as shown by Fig. D to the required level for carrying the slabs. When the slabs are properly carried by the hand-cars the end piers E are removed, leaving the slabs carried entirely by the hand-cars as shown by Fig. D. Care should be taken to lay the tracks for the handcars perpendicular to the center line of the main track, and when transfering the slabs from the piers to the hand-cars great caution should be taken to assure the slabs being in a position parallel to the center line of the main track. By so doing, it will facilitate the work when placing the slabs on to the bridge seats.



Asphalt Cement

On account of the great difficulty of getting a perfect contact between the bridge seats and the concrete slab, a layer of asphalt mixed with cement and sand is put over the bridge seats before the slab is erected in place. This mixture of asphalt-cement-sand acts as a filler for all voids that might exist between the bridge seat surface and the bottom of the slab. After the slabs are put on, this asphalt



mixture is filled in vertically from the top at the end of the bridge and also rammed in horizontally to fill up remaining voids. The proportion of the asphalt mixture was ; 138-lbs. asphalt, one cubic foot of cement, and 4.5 cubic feet of sand. The asphalt mixture is applied when in the plastic or semi-liquid state, but will consolidate very quickly.

In 89 Minutes

The time required for the erection work was as follows :—

Removal of old bridge and track	12 minutes.
Pushing new slabs into place and levelling up ...	20 ,,
Packing ballast and putting on track	57 ,,
Total time	89 minutes.

The greatest amount of time consumed was in the dumping and packing of the ballast. It was important that the ballast should be well packed as a train would pass over the bridge immediately the erection was completed. The passage of the first train over the new bridge produced no appreciable sign of settlement of the track.

Cost of Bridge

The work of casting the slabs and erecting same was entirely carried out by railway coolies. Altogether about 25 coolies were used for the erection work, among them a few carpenters and masons. There were about ten track coolies. The cost for this bridge was as follows :—

	Material	Labor	Total
Making forms	$47.52	$43.47	$90.99
Casting slabs	586.39	138.95	725.34
Remodeling abutments, etc ...	108.43	98.36	206.79
Total	$742.34	$280.78	$1,023.12

The cost for the timber for forms and bents are distributed over several bridges as practically all the timber can be carried forward to other bridges for similar use.

Previous to the removing of the old bridge numerous baskets full of ballast were prepared, also several flat cars with removable sides were filled with ballast. As soon as the slabs are in place the ballast in the baskets is first dumped on the new bridge, and then the track is laid over which the flat cars of ballast are pushed on and unloaded. This saves considerable time in the ballasting work. Up to the present writing 35 slab bridges have been successfully erected under traffic, and as this work goes on, the men gain more experience which is bound to result in better and quicker work.

Reinforced Concrete Superior

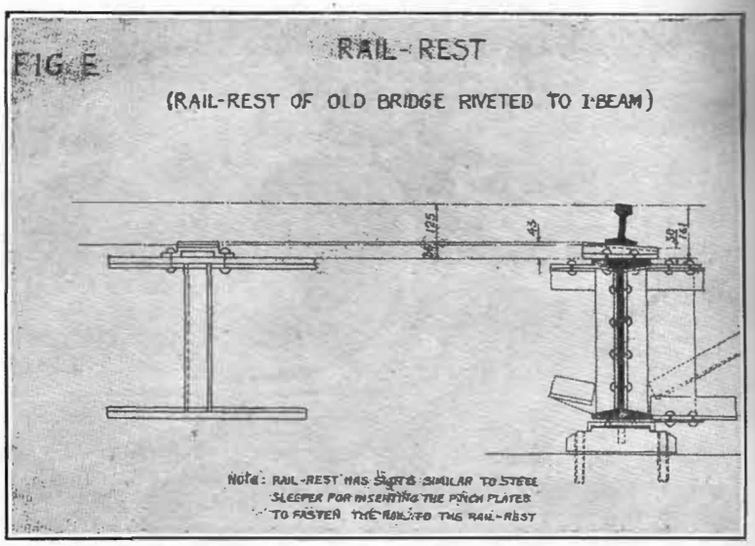
The reinforced concrete slab bridges are certainly much superior to the former I-beam bridges, for the slab bridge gives a much smoother track. Besides its maintenance is practically nil and possesses a longer life. The I-beam bridges on the Kiaochow-Tsinan Railway have no sleepers. The rail is placed on rail-rests which are riveted on the top flange of the I-beam as shown in Fig. E. Naturally this gives a very noisy track, and the impact and vibration caused by the passing trains hastens the loosening of the rivets. This results in a heavy expense in the renewal of these rivets. But when the train passes over one of these slab bridges no noticeable difference is felt by passengers on the train from that when riding over a track built on solid ground as the running is very smooth.

Use of Old I-beams

The I-beams of the old bridges taken out may be used as reinforcement for new slab bridges of shorter span, or it may be doubled up for another bridge, or scrapped if the condition is bad. In case the old I-beams are used for slab bridges, three spans of I-beams are required for one span of slab bridge, but when used in doubling up, two spans become one span material.

Besides the slab bridges described above, many concrete arches are put in to replace the present light bridges. This work is also carried on under traffic. Wherever there is good foundation and enough height for the springing line, the arch is used, the maximum span of the concrete arches being about 20 meter. In a later article a description of the erection of the concrete arch bridge under traffic will be given.

The reinforced concrete slab bridge shown in Fig. A was designed by our Bridge Engineer Mr. C. Y. Wang. The concrete casting and field erection work was carried out under the supervision of District Engineer Mr. E. K. Denn.



New Adriatic-Far Eastern Motorship

THERE has recently been launched from the Cantiere San Marco of the Stabilimento Tecnico Triestino, the motorship *Remo*, which has been built to the order of the Lloyd Triestino at Trieste. Present at the launch were H. E. Ciano with his family, and the vessel was christened by Mrs. Ciano. This motorship is 147.75 metres in length, 18.90 metres in breadth, and 10.65 metres in depth. The motorship *Remo* is of 11,000 tons deadweight and her contract speed is 13 knots.

The *Remo*, which is a sistership to the motorship *Romulo*, launched some few months ago, and which is to be employed together with her sister ship and also with the motorships *Esquilino* and *Viminale*, on the monthly passenger and freight service between the Adriatic ports and the Far East, is a double bridge type vessel with fore, central and poop castles. Amidships is passenger accommodation for 50 passengers, including double berths cabins, and the dining saloon, while above is the verandah, the smoking room, the music and reading room and two special cabins.

The holds are fitted with six large hatches, each of which is served by sixteen electric winches driving ten derricks of three tons and six of five tons. The propelling machinery of the *Remo* will consist of two single-acting 4-stroke Diesel engines of 2,500 i.h.p. The engines consist of six cylinders each having a diameter of 740 mm, and 1,200 mm piston stroke.

Utility Launch for Singapore.—For harbour work in Singapore a 30-ft. standard utility launch has been ordered from the Bergius Co. She has a beam of 7 ft., and is to be quipped with a 15 h.p. Kelvin sleeve-valve engine.

Motor Roads at Fenghwa, Chekiang.—A motor bus service company organised at Fenghwa, Chekiang province, has been registered at the Industrial Commissioner's office. The company has completed a survey of the route between Hsiwu, Husiuliu, Chowkiatungmen, and Takiao, a distance of 20 *li*, for the building of a motor road. Construction will be started very soon. Another road between Kiangkow and Siaowangmiao has been improved by the Hwei Lu Motor Bus Service Bureau, and light cars have been running on this section this summer at a charge of 40 cents for a single trip per passenger.

Good Year for Shipping in Manchuria.—With the exception of the Ching Po Co., which is not adequately financed, all shipping companies on the Sungari and Heilungkiang Rivers have made handsome profits this year. The Government Navigation Bureau has netted a profit of $700,000, the Tung Ya Co., $300,000; the Kwang Sin Co., $100,000; the Mail Boats Bureau, $90,000. This success is due to four reasons: (1) unification of passenger and freight rates, fixed by the Shipping Merchants' Guild, and consequent freedom from cut-throat competition; (2) high water on the rivers; (3) suppression of bandit activities; and (4) good crops in the river valleys.

Lien Bik Knitting Mill, Shanghai.—The Lien Bik Knitting Mill, 191 Yuan Tai Li, Paoshan Road, Chapei, Shanghai, has increased its capital for the purpose of manufacturing raising and Rashal machines after German models by its Iron Works Department. The department was added to the factory in March, 1924, and since then has been able to turn out two kines of machines; winding machines and handle circle knitting machines, which are adapted from foreign makes. The factory was organized in 1917 by two brothers, Chêng-po and Yuen-tzŭ Li with an initial capital of $25,000. The factory itself is engaged in the manufacture of socks and stockings, gloves, scarfs, and sweaters.

Dairen to Instal Automatic Telephones.—The Telephone Administration of Dairen, Manchuria, is installing automatic telephones in place of the old system. New equipment has been ordered from America and the work of installation is expected to be completed before the end of the year.

Amoy-Changchow Railway.—The Ministry of Communications has appointed a commission of four railway experts, Sha Fu-chün, Chen Ch'ing-wen, Chen Mou-chieh, and Lin Tsê-chêng, to make an estimate of the assets of the Amoy-Changchow Railway. The estimate is to be made with the intention of turning over the management to a group of overseas Amoy merchants represented by Huang I-chu. These merchants have been negotiating with the Ministry for some time, and are willing to refund $1,100,000 advanced to the railway since its management was taken over by the Ministry some ten years ago. The line was constructed in 1908. The president of the company is Chen Pao-ch'un and the vice-president Yeh Shou-wang. The railway line is about 45 *li* long.

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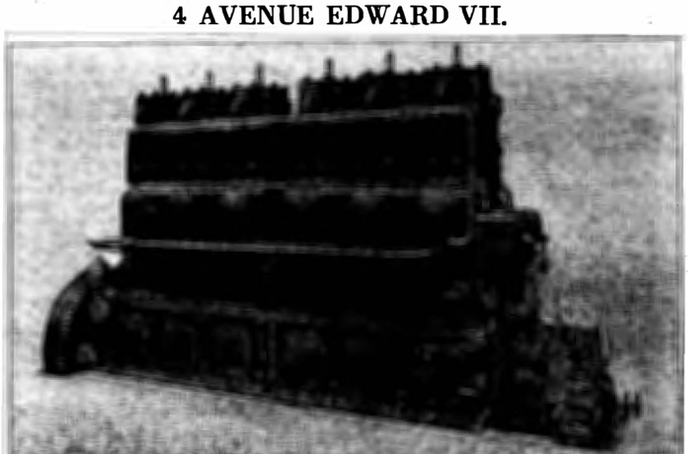

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FINANCE ENGINEERING COMMERCE

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遠東時報

AN UNEQUAL DOCTRINE

THE KEYS OF EMPIRE

BETWEEN THE DEVIL AND THE DEEP BLUE SEA

BETRAYAL OF WILSON AND HARDING

THE CONFLICT OF POLICIES IN CHINA

THE PORT OF VLADIVOSTOK

Vol. XXIII | February, 1927 | No. 2

The Bridge Across the Yalu

Engineering Feats in Kwantung*

What Has Been Done in Twenty Years Under Japanese Supervision and Initiative

AMONG the numerous foreign-controlled and administered areas in China, perhaps one of the most interesting, from the engineer's standpoint, is the Kwantung leased territory in southern Manchuria. Here we have the result of twenty years of Japanese government, following a brief Russian regime which ended with the Russo-Japanese war.

Recently, to celebrate the twentieth anniversary of the establishment of the Kwantung government, the Japanese administration issued a pamphlet, fully illustrated, describing the accomplishments and present state of the leased territory and the South Manchuria Railway zone, which is also under Japanese control. Many items of information contained are of general interest, particularly to those who are engaged elsewhere in China in development work of various kinds.

Railway Progress

As the introduction states, the part of Manchuria under Japanese administration amounts to only 1,400 square miles, and this area includes the S.M.R. zone which traverses the heart of southern Manchuria, from Dairen on the coast to Changchun, from Mukden to Antung on the Korean border, with three short branch lines, nearly 700 miles of railroad. The S.M.R. Company commenced operations in April 1907 and to-day is one of the leading companies in the world. Its authorized capital in 1920 was Yen. 444,000,000.

The company does not confine itself to purely railroad matters, but its enterprises include administration of the railway zone and iron and steel works, mines and harbors. Until a short time ago it also controlled gas and electricity works, but these have since been separated into independent companies with private capital. The main railway, from Dairen to Changchun, is 438.5 miles long, while the shortest line, from Hunho to Yushutai, is only two and a half miles in length.

The main line was completely reconstructed in June 1908 on standard guage, and in November 1911 the Mukden-Antung line was reopened on a new basis. To judge the progress made by the S.M.R. Company between 1907 and 1925 one need only regard a few simple statistics. In 1907 there travelled by these lines a total of 1,562,221 passengers and 1,486,434 tons of freight, but in 1925 these figures had increased to the total of 9,109,004 passengers and 15,045,200 tons of freight. The railway equipment is up-to-date and claimed as among the best in the Far East.

Drawing Room of the Special Saloon, South Manchuria Railway

Coal and Iron

The Fushun and Yentai coal mines, east and south of Mukden, and the Anshan iron mine, south of Mukden, are the chief mines operated by the railway company. The Fushun collieries are situated about 20 miles east of Mukden and have a branch line connecting them with the main line and with the capital of Fengtien province. The coal field covers some 14,900 acres—nearly ten miles from west to east and two and a half miles from north to south. The coal is mostly bituminous and supposedly of the Tertiary period. The veins have an average thickness of 130 feet, ranging from 78 to 420 feet.

In 1925 the total output of these Fushun collieries amounted to 5,681,600 tons, and about 930,000,000 tons are claimed in this one

*Oriental Engineer.

mine, one of the biggest in the world. The Yentai coal mine, on the other hand, while producing 5,799,000 tons in 1925, is estimated to have a deposit of only 20,000,000 tons. The railway uses this coal on its own lines and in its factories and also markets quite a large quantity besides. The coal field covers 1,900 acres, one mile from west to east and three and a half miles from north to south.

Steel Frame Dining Car.—Built for the South Manchuria Railway Company, Shakako Workshop, Dairen

Oil and Steel

At the Fushun mine oil is being distilled, with promise of success, from the shale deposits, which are about 300 feet of seam above the coal veins, with an estimated reserve of 5,500,000,000 tons. Beginning last September, following many tests by experts, a furnace on the Internal Heating System was constructed, and 2,000 tons of shale will be treated daily according to this plan, making an annual total of 700,000 tons. If these experiments succeed, Japan will solve one of her difficult problems, obtaining each year about 50,000 tons of oil, 1,000,000 gallons of naphtha, 4,000 tons of paraffin and 9,400 tons of ammonium sulphate.

The Anzan iron and steel works are situated along the railway between Anshan and Lishan stations. The first furnace was completed in April 1919. About 4,580 acres had been purchased for the plant compound and for town building. The ores of the mine, however, were found to be rather poor in quality, containing from 40 to 60 per cent. of metal and being mostly hematite. The poor ore is being worked economically at present by the hematite reducing system, invented by a Japanese expert at the works, and by this treatment the ore is concentrated before being charged into the blast furnace. The annual output of pig-iron from two blast furnaces amounts to 220,000 tons.

Town Planning

Among the more important feature of the administration of the railway zone are town planning, management and lease of land and buildings, sanitary work, agricultural, commercial and industrial institutions, and the Central Laboratory and Geological Institute. Under town planning come surveys, roads, bridges, waterworks, sewerage, ground leveling, parks, shore protection, and cemeteries. New towns, built after Western models, with broad streets, parks, hotels, hospitals and markets, have appeared in the zone during the past score of years, though at considerable cost, as this phase of the company's work ranks third—after railways and mines.

In the Kwantung leased territory the Communications Bureau heads 322 subordinate offices, which control and conduct all services of mail, telegraph, telephone, postal money order, postal savings, radio, electrical enterprises, etc. In March 1926 there were 40 post offices, with 8 branches, 16 sub-post offices, 140 postal agencies, 12 wireless stations, two on land and ten on ships, 2 telephone offices with 16 sub-stations, and 6 telegraph agencies with 82 railway telegraph agencies. An automatic telephone system was installed in Dairen in 1923, before Japan enjoyed this modern system. Telephones are used in the principal centers of population.

Even Broadcasting

For over a year Dairen has had a broadcasting service. Every day both Japanese and foreign music, lectures, market and weather bulletins and current news items may be heard at small expense. Thus Dairen ranks with the minority of cities along the China coast which are permitted to enjoy broadcasting by radio.

The Fushun Collieries

Dairen possesses one of the finest harbors in the Far East, and her foreign trade has jumped from Hk. Tls. 14,000,000 twenty years ago to Hk. Tls. 284,410,414 in 1925. Among the principal imports are vehicles, machinery and building materials. China accounts for 20 per cent. of the total export and 30 per cent. of the total import, while Japan exports 60 per cent. and imports 40 per cent. In 1925 a total of Yen 107,370,000 from bean cake and bean

Development of Through Traffic on the Chinese Government Railways

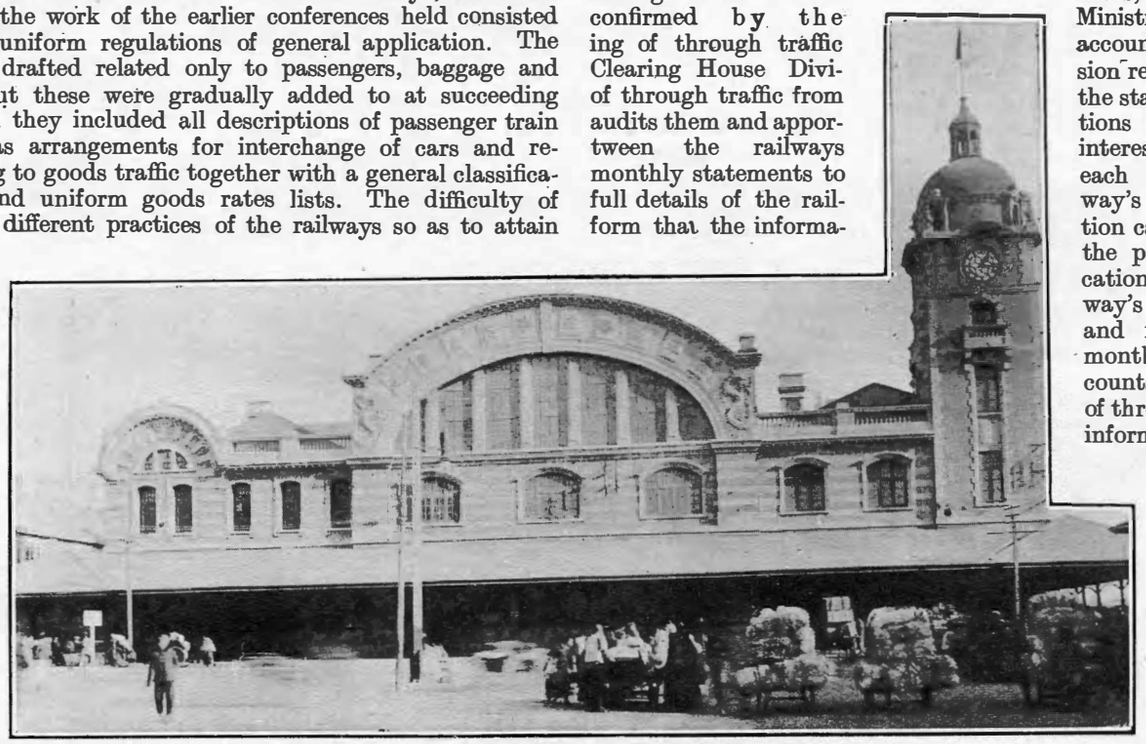
IN these days when the general outlook in China seems dark and people are given to pessimism regarding the future, it is inspiring to note that at least one aspect of transportation is receiving attention. In spite of the enormous difficulties, financial and otherwise, which exist on the Chinese railways, their through traffic arrangements have been improved, while extensive developments have been planned in readiness to be brought into operation immediately the military situation improves sufficiently to permit of this being done. The domestic arrangements and the international relations of the railways have both been well taken care of, the fruits of past years have been preserved, and the seed has been sown for the future. Through traffic development has been largely taken as a matter of course by travellers and merchants who have never realised the amount of labor which has been expended in making the arrangements for their convenience and benefit. The present seems an opportune time to supply a little information on the development of through traffic on the Chinese Government Railways.

Through traffic in China first began to receive attention in the year 1913. Prior to that year the different railways in China were content to function in their own territories with their own particular regulations, fares and rates, classifications of goods, etc. Passengers making a journey over two or more lines has to rebook at junctions ; goods had also to be rebooked, and in many cases had actually to be transferred from the cars of one railway to those of the other when they arrived at a junction station. The inconvenience and delays which arose under those conditions were very great and the growth of travel and trade was thereby heavily handicapped. Another grave disadvantage to trade was caused by the different regulations, classifications, etc., of the various lines, which made it a very difficult matter for a merchant to calculate the freight charges on his goods and so find out whether he could afford to transport them and make a profit on their sale in another district or town. Through traffic arrangements have made these conditions things of the past.

When through traffic arrangements between the railways were first discussed, the need for uniform passenger and goods regulations and a classification of goods applicable to all the Chinese Government Railways became at once evident. Through traffic conferences, composed of members from the different railways, have met periodically and the work of the earlier conferences held consisted in working out uniform regulations of general application. The first regulations drafted related only to passengers, baggage and parcels traffic but these were gradually added to at succeeding conferences until they included all descriptions of passenger train traffic, as well as arrangements for interchange of cars and regulations relating to goods traffic together with a general classification of goods and uniform goods rates lists. The difficulty of harmonising the different practices of the railways so as to attain the uniformity necessary may be imagined and it says a great deal for the spirit of give and take manifested by the delegates attending the conferences that uniformity was finally attained. So successful was the work of the through traffic conferences that the passenger and goods regulations and the classification of goods drafted by them for through traffic were finally adopted for use generally on all the Chinese Government lines. The development of through traffic thus contributed indirectly, but effectively, to the policy of the Chinese Government in unifying the railways into a national system.

Through traffic development in all countries, however, has not been found possible to the fullest extent without some central and neutral authority to which can be entrusted the co-ordination and execution of arrangements, the issue of through tariffs and other matters and the making of plans for the future. China has been no exception to this rule. When through traffic was first inaugurated the duties of management referred to above were entrusted to the Peking-Mukden Railway for a term of five years, with the provision that at the end of that period another railway should be designated to undertake the duties. However, before the expiry of the first period of five years it became very evident, owing to the growth of through traffic, that a special and independent organisation was necessary to undertake the duties of management and for this purpose the Ministry of Communications on the advice of the railways established the Railway Through Traffic Administration which began to function in September, 1918.

The Railway Through Traffic Administration is organised in four divisions, viz., General Affairs, International Through Traffic Affairs, Domestic Through Traffic Affairs and Railway Clearing House. It is controlled by a Director and Co-Director and, to ensure the necessary liaison with the Ministry, the post of Director is held concurrently by the Director of the Railway Department of the Ministry. The Administration is entrusted with the management of all matters relating to inter-line business such as correspondence on through traffic matters, joint station affairs, conferences, regulations and tariffs, through time tables, and the clearing of through traffic revenues together with the records and accounts relating to interchange of rolling stock between the railways. It is also charged with the duty of making investigations and plans for developing through traffic. It has also, in recent years, been entrusted with the preparation of advertisements, publicity and tourist literature and posters for the railways. The interests of the railways are fully safeguarded as the Administration can take no executive action on any matters which have not been first approved by the railways, either by correspondence or at the various through traffic conferences, and subsequently confirmed by the Ministry. In the clearing of through traffic accounts, the Railway Clearing House Division receives the returns of through traffic from the stations, thoroughly audits them and apportions the receipts between the railways interested. It supplies monthly statements to each railway, giving full details of the railway's traffic in such a form that the information can be carried into the prescribed classification heads in the railway's own accounts, and it also supplies monthly abstract accounts for each variety of through traffic which inform each railway what balances it is due to pay, or to receive from other railways for through traffic. The Railway Clearing House does *not* receive or pay out through traffic balances ; the



Peking Station

railways settle these directly between themselves on the figures as contained in the above-mentioned monthly abstract accounts. The railways have entrusted all their through traffic accounting work entirely to the Railway Clearing House, thus saving considerable expense to themselves, as the Railway Clearing House can deal with the whole work much more economically than if each railway maintained its own staff for it. The railways safeguard their revenue interests by annually appointing two auditors, who examine on their behalf the accounting methods and the statements issued by the Railway Clearing House and report the result of their examination to the Chief Accountants' Through Traffic Conference.

The Railway Through Traffic Administration also represents the Chinese Government Railways at all international through traffic conferences, while its Railway Clearing House Division receives and checks all statements of revenue for international traffic which relate to the Chinese Government lines, compiles all statements required on their behalf, apportions the revenue and prepares and issues the necessary returns of traffic and settlement accounts to each line concerned.

An annual budget is prepared for the expenses of the Railway Through Traffic Administration, and the railways contribute to the total staff salaries and working expenses according to their shares of the annual revenue from the through traffic dealt with by the Railway Clearing House. The budget, statements of annual revenue, and other necessary details are circulated to the railways concerned for their information. The Ministry also examines and approves the annual budget and audits the receipts, salaries and working expenses of the Administration from the monthly returns, which, with all necessary receipts and vouchers, are prepared and submitted for this purpose.

As the appended statement of through traffic revenue dealt with by the Railway Clearing House shows, the development of through traffic on the Chinese Government Railways has been very great and, but for the unfortunate interruptions of the railway lines which have been caused by military operations at different periods, the development would have been still greater. This development became very marked as the influence of the Railway Through Traffic Administration began to make itself felt in the extension of facilities. The work of this organisation for the first two years largely consisted in planning out extensions of old arrangements and inaugurating new ones. The result of this work becomes evident in the revenue figures for 1921, and the figures for that year, and the increase and new business of subsequent years, give ample justification for the establishment of the Railway Through Traffic Administration and evidence of the valuable work performed by it in the interests of the railways. The figures regarding revenue from interchange of rolling stock have not been give in the statement as this is really not considered "revenue," strictly speaking, but rather payments to each other for the use of each other's cars.

The following is a list of the through traffic facilities as they exist at the present time:—

1. Between the Chinese Government Railways:

   (*a*) The issue of through tickets, i.e. ordinary single, express extra, sleeping berth, return tourist, circular four, party trip and students' reduced fare tickets.

   (*b*) Through registration and insurance of baggage and parcels, together with a C.O.D. service for parcels.

   (*c*) Through booking of all descriptions of miscellaneous traffic by passenger trains.

   The above through bookings are presently confined between the principal stations only but arrangements have been completed, ready to be enforced as soon as circumstances permit, for their extension between all stations on the different lines.

   (*d*) Through booking and transportation of goods between all stations on the different lines.

2. Between China and Japan:

   The issue of through single, return, circular tour and party trip tickets between principal places in China and stations on the South Manchuria Railway and cities in Chosen and Japan by the routes via Chosen, via Shanghai and steamer and via Tsingtao and steamer.

   The through registration of baggage and parcels and C.O.D. parcels service is also in force between the two countries.

3. Between Chinese Government Railways and the Chinese Eastern Railway:

   The issue of through single and return tickets and the registration of baggage and parcels between the principal stations via the route Mukden-Changchun.

4. Between the Chinese Government Railways and the Ssupingkai-Taonan and Kirin-Changchun Railways:

   The issue of through single and return tickets and the registration of baggage and parcels between the principal stations.

In addition to the above, arrangements are almost completed for the through invoicing of goods between stations on the Chinese Government and South Manchuria Railways *via* Mukden. The arrangements for this are now being worked out between the Railway Through Traffic Administration and the South Manchuria Railway, and when they are completed and enforced a very great advantage will be found by traders.

A conference is also scheduled to take place in Tokyo next January to draw up arrangements for the through booking of passengers and their baggage between the principal cities in China and those in Canada and the United States. Invitations to the carriers concerned have already been issued jointly by the Ministry of Communications and the Japanese Department of Railways, and it is confidently expected that great benefits to travellers will result from the meeting.

Negotiations have also been going on for some time for a resumption of the through bookings to Europe which were formerly in operation and which were terminated by the outbreak of the European War. It is hoped that these negotiations will reach a happy conclusion in the near future.

The Chinese Government Railways, in developing their through traffic arrangements, proceeded slowly at first and were content to take one step at a time. However, of recent years the work has been speeded up and the railways have now every reason to be congratulated on the present results, and the public can confidently expect further and more extensive facilities in the future.

COMPARATIVE STATEMENT OF THROUGH TRAFFIC REVENUE DEALT WITH BY THE RAILWAY CLEARING HOUSE DIVISION OF THE RAILWAY THROUGH TRAFFIC ADMINISTRATION FOR THE YEAR 1919 TO 1925, INCLUSIVE.

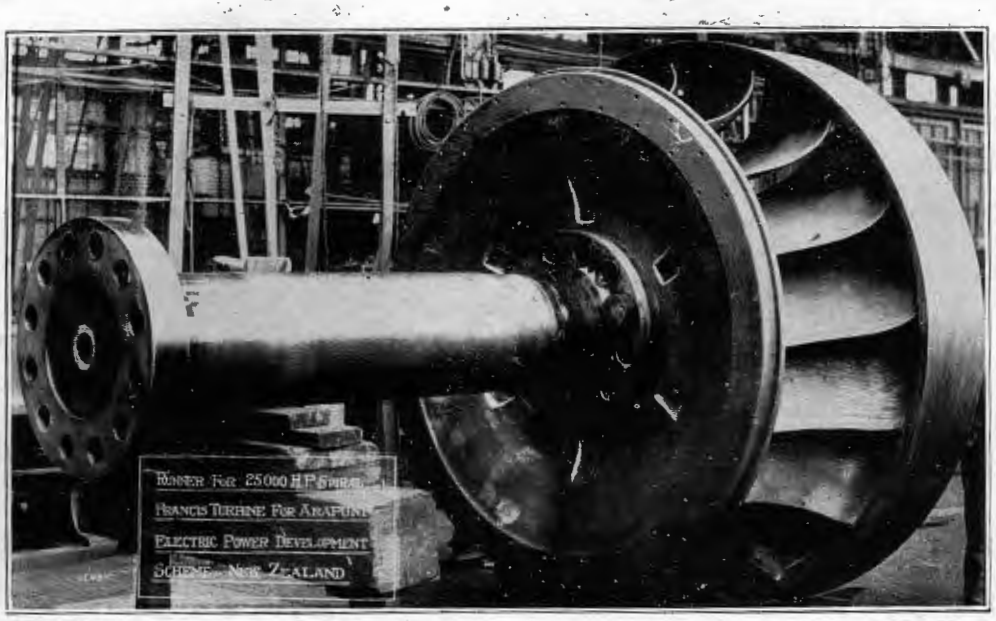
	Year 1919	Year 1920	Year 1921
Passenger Traffic:—			
Domestic	$2,282,890.71	$2,358,405.45	$3,006,968.53
China-Japan	354,803.85	357,679.40	318,738.41
C.G.Rlys.-C.E.Rly.	—	—	—
North China	—	—	—
Goods Traffic:—			
Domestic	—	545,047.10	1,261,232.60
Total	$2,637,694.56	$3,261,131.95	$4,586,939.54

	Year 1922	Year 1923	Year 1924	Year 1925
Passenger Traffic:—				
Domestic ...	$2,989,286.66	$3,613,533.17	$3,437,890.93	$2,932,494.98
China-Japan ...	189,832.21	222,036.90	220,872.57	244,093.73
C. G. Rlys.-C. E. Rly. ...	92,910.46	184,530.82	296,925.38	536,143.93
North China ...	—	38,703.23	64,661.40	95,939.95
Goods Traffic:—				
Domestic ...	5,595,932.02	9,010,165.84	7,340,544.93	4,801.873.60
Total ...	$8,867,961.35	$13,068,969.96	$11,360,895.21	$8,610,546.19

can be treated to give the same results, from this it can be seen that the mechanical properties of "Vibrac" steel in the interior, say, of a locomotive axle, will be the same as on the surface.

(4) "Vibrac" can be treated to give very high breaking strength and yet retain proportionally great toughness, a test piece from material treated to over 100 tons tensile bend over an angle of 180 degrees.

(5) "Vibrac" steel only needs to be air cooled and tempered, where other steels must be quenched in some liquid to will obtain good results.



Messrs. Sir W. G. Armstrong Whitworth & Co., Ltd.

One of three runners for the turbine of the Arapuni (New Zealand) Hydro-Electric Plant. These runners are of the Francis type and develop 25,000 b.h.p. under a nett head of 172 feet, running at 214 r.p.m.

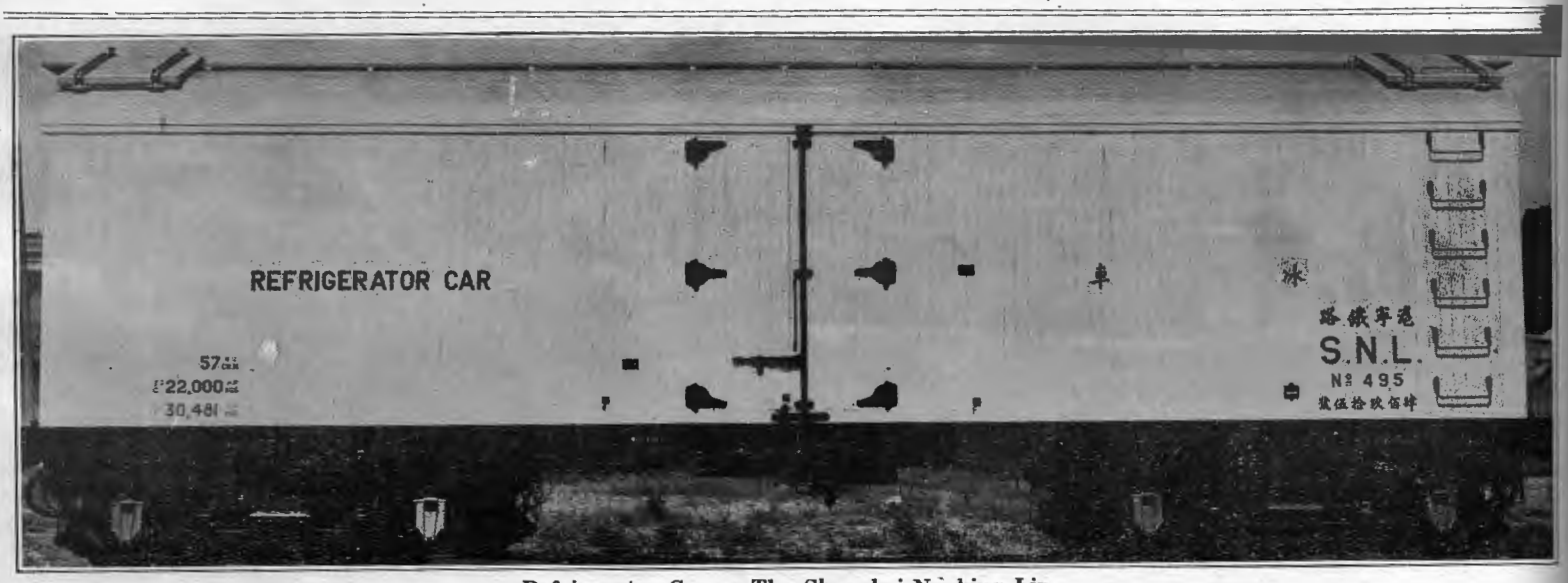
The runner has a diameter of 8 feet at the throat and is built up of $\frac{3}{8}$ inch plate steel buckets forged between dies in a hydraulic press. The finished weight of each runner is 10½ tons and a best efficiency of 91% has been guaranteed of these runners by the makers.

(6) "Vibrac" will machine with the same facility when hardened to 70 tons as ordinary Nickel Chrome Steel will at 60 tons.

(7) "Vibrac" undergoes a minimum of distortion on hardening.

(8) "Vibrac" whilst infinitely superior to any Nickel Chrome Steel can be marketed at the price of the usual high grade alloy steels.

We understand that this new steel already has a wide vogue amongst Locomotive manufacturers, automobile makers, etc., for highly and intermittently stressed parts.



Refrigerator Car on The Shanghai-Nanking Line

Refrigeration Car Service on the Chinese Government Railways

THE twenty-one refrigerator cars ordered by the Ministry of Communications in the middle of 1925 from the Ateliers Metallurgiques de Nivelles, Belgium, through the Societe Belge d'Enterprise en Chine, S.A., have recently been delivered and will shortly be put into operation.

The cars have been allotted to the Peking-Mukden (4), Tientsin-Pukow (9), Shanghai-Nanking (5) and Shanghai-Hangchow-Ningpo (3) Railways. They are intended for the carriage of fresh fruits, fish, meat, and vegetables, a considerable demand for which exists in the cities of Peking, Tientsin, Tsinanfu, Tsingtao, Nanking and Shanghai. At the outset it is intended to operate a daily service between Peking and Shanghai, local services being arranged as required.

The cars have a capacity of 22 metric tons each with a tare weight of 30 tonnes. The interior is divided into two separate compartments which will permit of different temperatures being maintained and the simultaneous movement of such commodities as fish and fruit.

The underframes are those of a standard Chinese 40 ton wagon resting on passenger bogies. Westinghouse Air Brakes and Automatic Couplers have been applied which will enable the cars to run in passenger trains.

For icing purposes two bunkers have been provided, one at each end of the car, holding 1 and 2 tonnes of ice respectively. Access to the bunkers is gained by insulated roof hatches so that ice may be replenished without opening the car.

Below are given some of the more important dimensions :—

	metres
Length between pulling faces of couplers ..	13.452
Length over striking castings	12.742
Length of underframes	12.500
Length over end posts	12.000
Length inside	11.700
Length between bulkheads	9.600
Length short compartment	3.800
Length long compartment	5.700
Width over body	3.050
Width inside	2.750
Width over underframe	2.870
Height from rail to top of underframe	1.273
Height from rail to top of floor	1.473
Height from rail to eaves	3.580
Height from rail to top of roof	4.320
Height from rail over running board	4.380
Height of coupler center to rail	1.092
Center to center of trucks	8.300

New Paper Mill Under Organisation at Foochow.—Paper is one of the four principal products of Fukien province, but owing to the crude methods employed in the old-style paper mills, the product is poor in quality. Consequently, Japanese paper has been imported in increasing quantities in recent years. Su Yu-ming, a native of Tingchow, Fukien province, who studied paper manufacturing in France, is now promoting the organisation of a modern paper mill at Foochow, utilizing the raw materials produced in the districts of the upper Min River. His plan has received official support and preparations are being made for the new establishment.

Lieh Ching Hing Tin Canister Works, Shanghai.—The Lieh Ching Hing Tin Canister Works, 186 Alcock Road, Shanghai, moved to its new factory, JN 150 Paoting Road, Shanghai, on November 12. The company has 13 tin manufacturing machines and 16 workers employed in manufacturing tins. The sales office is at the corner of Shantung and Canton Roads, Shanghai. The proprietor is Wu Sing-kwang.

Par Lee Phonograph Co., Shanghai.—The Par Lee Phonograph Co., 435 Foochow Road, Shanghai, was formally opened for business on November 22. It has a factory in Chin Hsing Li, Yung Hsing Road, Chapei, Shanghai, which is engaged in manufacturing the wooden bodies of phonographs and other minor accessories and in repairing gramophones of foreign make. The manager is Chou Ho-ying.

China Ho Shing Tobacco Company.—Two new brands of cigarettes under the names of "Green Trees" and "Bees" are being manufactured by the China Ho Shing Tobacco Company, 1044 Tung An Li, Tongshan Road, Shanghai, and will soon be put on sale. The company was established in October, 1925. and has been engaged in marketing Feng Tieh Cigarettes which are sold at $105 per case containing 50,000 cigarettes.

North China Motor Service.—The North China Long Distance Motor Service, which has its head office at Chaomien Hutung, Tungssupailou, Peking, has a number of Dodge cars which make two round trips every week between Peking anh Jehol and one round trip beween Peking and Hupeikow. Special cars may be chartered by arrangement.

Taonanfu-Tsitsihar Railway.—A Reuter message from Dairen reports the completion to anganchi of the Taonanfu-Tsitsihar Railway, the contract for which was held by the South Manchuria Railway Company. The contractors are ready to transfer the enterprise to the Chinese owners. The contract for construction was closed for Y.12,920,000, providing for the payment of this amount within six months of Chinese assumption of control. In the event of non-compliance with this condition, the amount is to be converted into a loan on which interest at the rate of 9 per cent., is to be paid, repayment to be exacted within forty years, and amortization to begin at the end of thirty years. To reach its destination the new line has to cross the Chinese Eastern Railway. This has not yet been done because of diplomatic complications, Reuter remarks "it is thought in Dairen that there may be much discussion before this is allowed."

Five Railways Planned in Kirin.—Plans for the construction of five railways in Kirin province are being made by the Kirin gentry, as follows :

Chang Fu line—from Changchun to Fuyu—95 kilometers.
Ki Pan line—from Kirin to Panshih—60 kilometers.
Shih Yu line—from Shihtaochengtse to Yushu—130 kilometers.
Fushih line—from Fuyu to Shihtaochengtse—66 kilometers.
Ning Ta line—from Ninghai to Ningkuta—40 kilometers.

Manufactures in Manchurian Trade.—It may be interesting to see what position manufacturing industries occupy in South Manchuria in relation to general industries. With this in view, the following data were obtained in order to show the percentage of manufactured articles exported from Dairen, Autung, and Yingkow to the total amount of export trade done at the three ports in South Manchuria in the last six years, the units of the figures being one thousand HK. Taels :

Year	Total Amount of Exports	Mftd. Goods	Percentage
1920	173,043	79,041	45%
1921	181,113	90,713	50%
1922	207,267	91,821	44%
1923	234,732	107,843	46%
1924	203,387	92,366	44%
1925	247,303	97,367	39%

In the list of manufactured goods are included spirits, tobacco, beverages and comestibles, bean-cake, bean-oil, ramie, tussah-silk, waste silk, silk goods, paints, dyes, iron and ironware, metal goods, etc., the remainder of articles exported being made up of farm products. The ratio of manufactured goods shipped abroad to the total of exportation made from South Manchuria reached the maximum in 1921, but since then it gradually declined with the exception of 1923.

At a glance South Manchuria may look as though it is a great manufacturing country, because in 1925 when the shipment of manufactured articles was at the lowest ebb, the percentage still stood at 39 per cent. But then it must be borne in mind that in the articles turned out are included semi-manufactured articles such as bean-cake and bean-oil, which constitute the major portion of the figures tabulated as the amount of manufactured goods, as the table below proves :

Year	Total Mftd. Goods	Bean-Cake & Bean-Oil	Real Mftd. Goods
1920	79,041	67,006	12,035
1921	90,713	69,688	31,025
1922	91,821	72,441	19,380
1923	107,843	81,914	25,929
1924	92,366	74,699	17,667
1925	97,367	77,078	20,289

How insignificant the real manufacturing industry in South Manchuria is can be noted when the attached table is glanced over, in which bean-cake and bean-oil and other semi-manufactured goods are classed as agricultural products :

Year	Real Mftd. Goods	Farm Products	Total
1920	6%	94%	100%
1921	12%	88%	100%
1922	9%	91%	100%
1923	11%	89%	100%
1924	8%	92%	100%
1925	8%	92%	100%

—*North China Standard.*

The Port of Vladivostok

(Continued from page 72.)

As a matter of fact this percentage should be much higher, as the Transit Section both with respect to natural conditions and technical equipment (even disregarding the conveyors) is the best part of the port and its average annual capacity is over 60,000 poods per lineal sajen.

Though the above named figures, extracted from the official records of the Port Administration, give some idea of what the capacity of the port is, it goes without saying that they are only general and approximate.

Summing up all that is said above, we come to the following general conclusion :—the constitution of the port (free port, Transit Grain Exchange, numerous facilities and privileges granted to all concerns and firms engaged in export and import operations), the excellent natural conditions (vast water area, its depth more than sufficient for big ocean steamers with the maximum draught, an extensive inner harbor well protected by surrounding mountains, and easy ingress), and, finally, the up-to-date technical equipment (convenient stone embankment with deep water and modern appliances, conveyors for loading and unloading, big storage capacity of warehouses for storing of commodities, railway sidings, shipyards, docks and repair workshops),—all these prove that the port of Vladivostok is one of the best organized and perfectly convenient commercial ports in the Far East.

Political Troubles and the Maintenance of Trade

(Continued from page 67).

While the force of this boycott and the continuance of the unfortunate situation in South China would seem to indicate an unenviable future for British trade in China, it is impossible to resist the conviction that the present anti-British bias is largely an artifical one, due entirely to the predominant part that Great Britain has hitherto played in foreign relations with China, as a result of which she has momentarily become a convenient whipping-horse in the eyes of the young Chinese nationalist, who is anxious to wipe out with a stroke of the pen all the so-called privileges that the foreigner has acquired by treaty in China. The political situation is at the moment so uncertain that it is impossible to make a forecast of any nation's future trade with this country. Leaving aside the great distributing organisations built up by British firms in this country for the sale of cigarettes, kerosene oil, sugar, chemicals, drugs and similar proprietary articles, which are in many cases not products of the British Empire, the interests of the actual manufacturer of British goods are still very largely bound up with the fortunes of the British merchant in China, on whom the present state of agitation and unrest has told very heavily.

In these circumstances it is essential that the manufacturer, whatever his own peculiar difficulties may be, should bear as large a share of the burdens of the merchant in China, and maintain as close relations with him, as possible. Complaints are still sometimes heard that the British manufacturer is too anxious to sell the Chinese a "better article" than is asked for, that he is too reluctant to bear his share of the cost of technical staffs to help in the development of his interests, that he does not give sufficient assistance in the matter of showrooms, advertisement and propaganda, and finally that he does not place sufficient data at the disposal of his representative, who is constantly obliged to refer to him. There is little doubt that the alleged indifference of the British manufacturer towards the particular needs of the Chinese is not so strong as it was, but neither is his position in this market so secure as it was. A satisfactory outcome for British trade from present difficulties depends not only on a solution of the political problem which will leave the foreign trader free to carry on his business unhampered by boycotts, civil wars, taxation and other unnatural restrictions, but on the willingness of the manufacturer to make every endeavor to suit the requirements of the market and to play his part in developing it.

Railways in Fukien.—In addition to their plan to take over the Changchow-Amoy Railway, a group of wealthy overseas Fukienese headed by Huang Yi-chu are negotiating for rights to build a line between Foochow and Amoy. This enterprise has been attempted on many occasions in the past, but lack of business capacity on the part of the promoters resulted in failure on each occasion. In this case adequate capital is available, as all the promoters are business magnates from Malaysia and have already shown their willingness to invest money in their native province. Many flourishing enterprises have been initiated by them.

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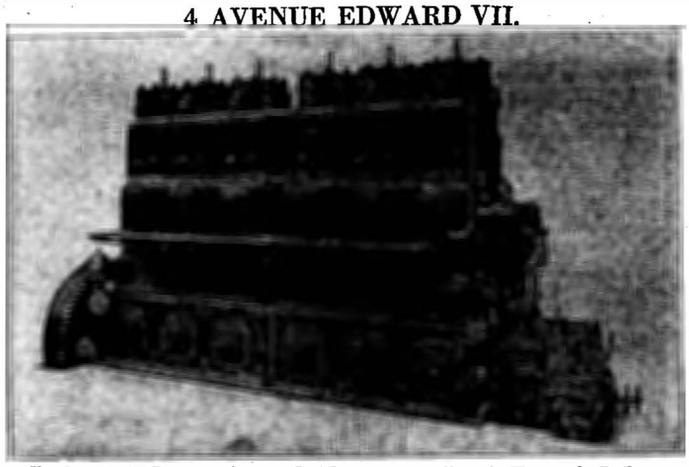

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DEGENERACY OF MANCHURIA

PEKING-MUKDEN RAILWAY WORKSHOPS

BRITISH TRADE AND INDUSTRY

YUNNAN-KOPEI RAILWAY

Vol. XXIII · March, 1927 No. 3

SHANGHAI, PEKING, TOKYO AND MANILA

The Peking-Mukden Railway Workshops*

Tongshan Workshops and their Importance

THE Workshops are located at Tongshan, and together with storage space, repair tracks, etc., cover an area of about 400,000 sq. yds. Besides undertaking the repair and overhauling of all rolling stock on the line, the whole of the passenger stock is built here, and, until recent years, all freight stock, as well as a certain proportion of the locomotives, to meet increasing traffic demands.

The workshops are the best equipped on the Chinese Government Railway System and employ about 3,000 men. The works are under foreign supervision and are well provided with machinery.

Locomotive, passenger and freight stock has, in the past, been built for other railways in China.

Materials Used

In building locomotives and cars, the wheels and axles, tyres, steel castings, couplers, springs, plates and sections in market sizes, and special accessories are imported. Local material is used when possible.

Practically the whole of the works machinery is electrically driven, power being generated on site, and the works are electrically lighted throughout. The water supply was a difficult problem, due to the fact that wells are the only practical available source of supply, and it was some years before good wells were located, which was first done by Mr. J. Turner of the Eastern Engineering Works. A 250,000 gallons, concrete, underground tank is utilised as a reservoir, and water is also stored in other three overhead tanks, with a combined capacity of about 90,000 gallons. Both steam and electric pumps lift the water to the requisite head.

View in Machine Shops, Tongshan Works

Shops Described

A description of the principal shops follows, giving dimensions of buildings, machinery in use, and class of work turned out in each. Shops, stores, and offices are heated, the shops by the Sturtevant Hot Air System and the stores and offices by low pressure steam.

Loco. Works Machine Shop. This consists of three bays, the centre bay 50-ft. wide, and the two outer bays 65-ft. wide, with a common length of 240-ft. Tool store and casehardening room adjoin main building, as do also coppersmiths' and tinsmiths' shops.

The principal machines are 5 Wheel and Axle Lathes, taking up to 7-ft. dia. on tread, Frame Slotting and Drilling Machine for frames up to 40-ft. by 4-ft. 3-in., about 12 at one time for slotting and about 6 for drilling, Duplex Boring Mill for axlebox brasses, etc; Planing and Slotting Machines, taking connecting rods up to 9-ft. 5-in. crs; Radial drills, Tyre Boring Mill, Cylinder Boring and Facing Machine, taking up to 21-in. dia. by 28-in. stroke cylinders. Piston rods are turned and ground to size, and all motion work is ground also, including radius links. Slide bars and all motion pins are also finished by grinding.

Light overhead cranes are in use over the two outer bays.

Electric welding is used for repairing cracked cylinders, reinforcing piston rod ends and other worn parts.

Engines' Tenders

This shop takes care of all machining concerning locomotives and tenders, and a good deal of work is also done for shops plants and tools.

Casings, mouldings, pipes, lamps, etc., are worked in the coppersmiths' and tinsmiths' shops adjoining.

A hydraulic press for wheel mounting is arranged near the tyre heating shop, which adjoins the machine shop. Tyres are heated in an oil fired furnace, for shrinking on wheel centers.

Compressed air is available in the shop, and hydraulic testing of valves arranged for.

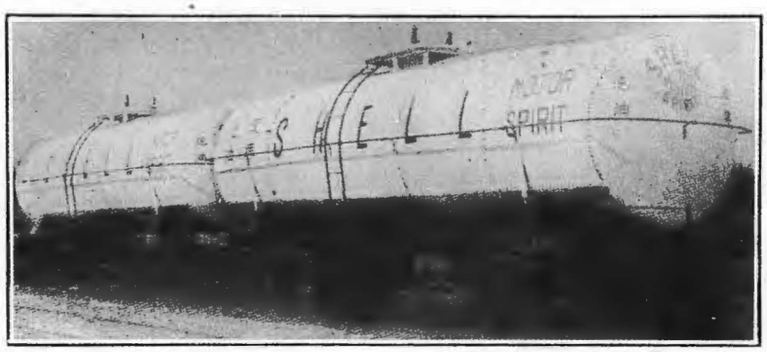
The Boiler Shop

Boiler Shop. This consists of two bays each 50-ft. wide by 375-ft. long, together with a smaller shop for boiler testing, 52-ft. wide by 212-ft. long.

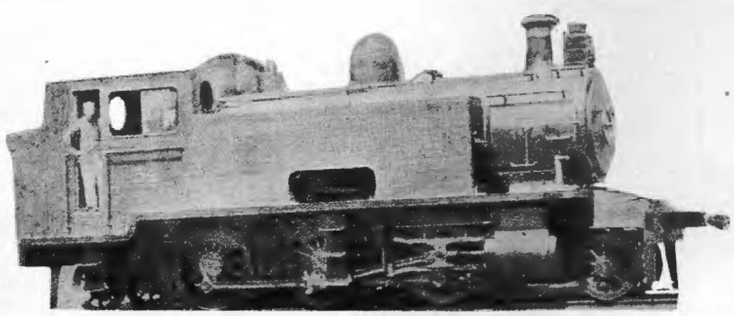
The boiler shell bay has a light electric overhead crane, and the bay handling complete boilers, an electric overhead crane of 30 tons capacity. Wall cranes are conveniently arranged for light lifts.

Machinery consists of Splitting Shears, the largest one taking 1-in. plate, Vertical Plate Rolls taking plates up to 12-ft. wide, and also Horizontal Rolls, Plate edge planing machine, Vertical Boiler Shell, Turntable Drilling Machine, Flanging Presses, Punching, Shearing and Cropping Machine, Radial Drills, etc.

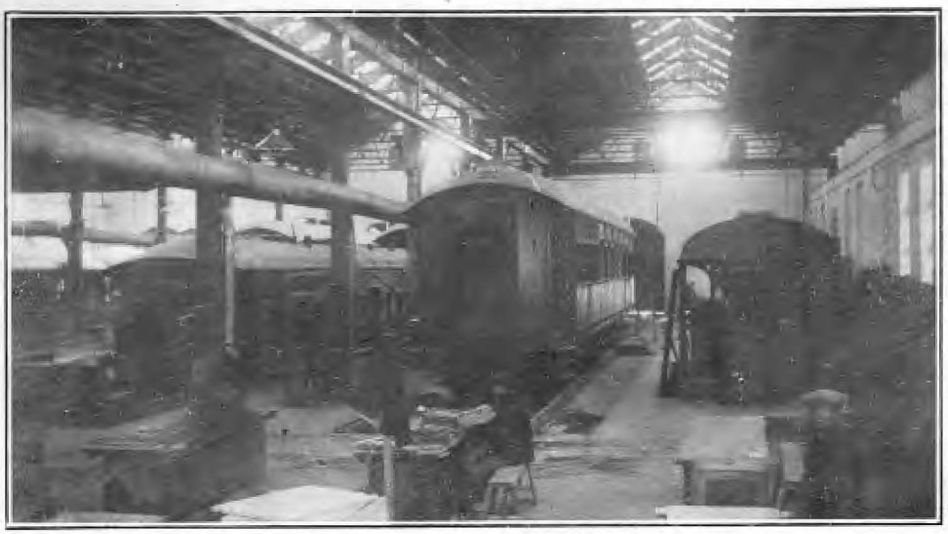
*Oriental Engineer.



30 Ton Capacity Benzine Tank Car Built in Works for A.P.C.



Heavy Shunting Loco. 10 Similar Built in Works



View in Car Shops, Tongshan Works

Pressing Plates

In the large flanging press, smokebox tube plates ¾-in. thick and 6-ft. 3-in. dia., bogie frames ½-in. thick by 14-ft. 0-in. by 3-ft. 0-in., and tank car ends up to ½ thick by 8-ft. 6-in. dia. are pressed. A plate furnace is located near presses and can take a frame plate, if necessary, 40-ft. long by 4-ft. 3-in. wide, and also heat a plate 9-ft. by 9-ft.

A hydraulic riveting pit, with overhead crane, is provided and open air blown fires, for local heating of plates, etc.

Boilers for all classes of engines on the P.M.R. are constructed, the smallest being about 3-ft. 5-in. dia. by 15-ft. 5-in. long overall, with a heating surface of 552 sq. ft. and a grate area of 13 sq. ft. and the largest about 5-ft. 8-in. dia. by 27-ft. overall, with a heating surface of 2,241 ft. grate area of 41½ sq. ft. and being arranged with arch tubes and superheater flues.

Repair Work

Repair work forms a large part of the shops activities. Provision exists for repairing 10 of the largest boilers at one time and about the same number of smaller ones. Electric welding plant is used for re-inforcing thin parts of fire-boxes, filling up cracks which develop in service, etc. Flue tubes are electrically welded over at firebox ends, after expanding and hydraulic testing.

The average life of a boiler is 18 to 20 years, but fireboxes require renewal about every 5 years, having had half sides once in this period.

Water at several points on the line is detrimental to firebox plates. A water softening plant is now installed at Kuyeh, and great improvement is already found in condition of boilers using the softened supply. Washing out and hot water refilling plants are in use at most of the loco. sheds and have a beneficial effect in keeping boilers in service by reducing tendency to scale and incidentally increase the available power by the quick turn round of engines.

Testing Boilers

The testing bay has pits for testing 4 boilers at one time and additional space for about 8 boilers, either under mounting or awaiting testing. Boilers are tested with hot water at 250 lbs. sq. in., and with steam to 180 lbs. sq. in., the working pressure. Smoke ducts, of ample size, are dropped over respective smoke-boxes, whilst boilers are under steam test.

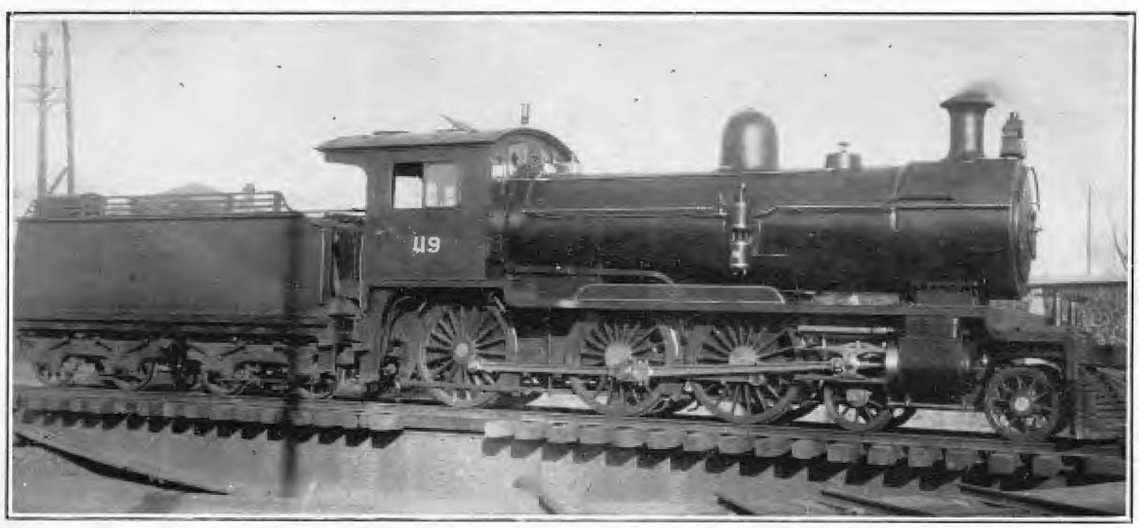
Automatic stay bolt machines are arranged as a group at opposite end of shop to testing pits.

Both pneumatic and hydraulic tools are used in the boiler shop.

The Tender Shop

Tender Shop. This is situated alongside boiler shop, is 260-ft. long by 52-ft. wide, and served with one 30 ton overhead electric crane. Pits are arranged, and provision exists, if required, for dealing with 20 tenders at one time. The standard tender in service carries 5,000 gals. water and 8½ tons coal on two 4 wheeled bogies and weighs 54 tons in working order.

Cabs, ash-pans, splashers, etc., are fabricated near the tender shop, and storage tracks for spare tenders, and those awaiting repairs, adjoin. A light transfer table, in shallow pit, permits tenders from erecting to pass shop approach to tender shop. Pneumatic hand tools are used throughout shop.



Rebuilt Locomotive, Tongshan Works

Turbine Engines, Tongshan Workshops

The Smiths' Shop

Loco. Smiths' Shop is 300-ft. long by 55-ft. wide and arranged with 33 fires, each served with draft through underground duct, by means of a motor driven blower. A spring tempering furnace is provided, and a shingling furnace and rolling mill, are, it is hoped, shortly to be installed, which will reclaim scrap material.

All ordinary locomotive forgings are worked, including crank pins, slide bars, foundation rings, coupling and connecting rods, piston rods, motion work,

Steam Hammers available are 2-one ten, 2-ten cwts, and 1-five cwt. Therc is also one Hot Saw and one set Cold Shears.

Adjoining the Smiths' Shop is the bolt and rivet shop.

Five upsetting machines form the heads on bar up to 1¼-in. dia. for bolts and 1-in. dia. for rivets. Heating furnaces alongside each machine obtain draft from three blowers.

Screwing and tapping machines form remainder of machinery.

Castings Made

Foundry. Iron Castings are turned out in the larger bay, which measures 260-ft. by 53-ft. and brass castings in the small bay, 100-ft. by 52-ft. The annual output is approx. 430 tons of cast iron and 100 tons of brass.

Such parts as piston valve cylinders, 21-in. dia. by 26-in. stroke, saddles and other usual loco. parts are regularly cast, the heaviest weighing about 40 cwts. Two cupolas with a combined capacity of about 6 tons are available.

For brass castings, a Morgan's tilting furnace is provided, of 400-lbs. capacity, and 5 other furnaces, having a total capacity of 20 cwts. of metal. The output consists of all brass fittings, valves, axlebox brasses, etc., usual in loco. and car work.

Constant Repairing

Erecting Shop.—The total number of locomotives on the line is 225, and about 10 per cent. are always passing through shops for general overhaul. This practically ensures every engine being dealt with, at interval of about 3 years. A general overhaul takes about 3 months, and an engine will usually run 150,000 miles between such overhauls.

The erecting shop has a capacity of about 25 locomotives and is 600-ft. long by 53-ft. wide in the main bay, two auxiliary bays being the same length by 21-ft. wide. The main bay had three tracks, the two outer being provided with pits, carried the whole length of shop, the center track, generally, being for movement.

Lifting Locomotives

Two 45 tons capacity, over head, electric cranes, with auxiliary light lifts, are used to lift engines from center track to alloted positions over pits. The heaviest locomotive is the Mikado class, weighing 81 tons in working order and 70½ tons light. There are twenty-three of these engines in service. Four of these locomotives were built at Tongshan, and four more are now under construction. The Pacific class, of which ten are in service, are of approx. the same weight as the Mikado class. Two are now being built at Tongshan. Other types built here, both for the P.M.R. and other Chinese Lines, are the heavy and light Mogul type for main line service, 53 of former and 21 of latter class, the more recent construction being fitted with superheaters and feed water heaters. For shunting, both heavy and light classes have been built, 11 of the former and 5 of the latter.

Electric welding and acetylene cutting are valuable adjuncts to the shop, such parts as broken frames, cylinders and covers, saddles, etc., being reinforced and repaired very quickly.

Interesting Tools

Tools of interest in the shop are cylinder and valve chest boring bar, motor driven, enabling parts to be re-bored and faced in place, an erecting block for erecting frames, ensuring correct transverse setting, and an axlebox guide facing machine, motor driven, also used on guides in place on frames.

One side bay provides facilities for work on springs and rigging, brake hangers, etc., and other details. The other bay is utilised for painting locos and tenders and as storage space for tenders and boilers awaiting repairs.

At the North end of shop, a flue shop 102-ft. by 61-ft. is provided, safe ending of large and small tubes and swaging down of tube ends being carried out on suitable machines.

A flue rattler displaces scale off tubes from service, and a large and small hydraulic tube testing machine is available, as well as a multiple spindle nut tapping machine, with a nut forging machine alongside.

Number of Cars

Car Works. Approximately 320 passenger and 4,300 freight cars are in service on the P.M.R., and all passenger and the greater number of freight cars, up to 30 tons capacity, have been built at the works. Of the passenger cars, the standard 1st Class is 65-ft., and the 2nd and 3rd Class 55-ft. over frames. The bodies are of timber, the under-frames being built up of steel. The 1st Class weighs about 40 tons, and the 2nd and 3rd Class about 25 tons. The freight cars are of 10, 20, 30 and 40 tons capacity. Open high sided cars are used mainly for coal traffic, built entirely of steel, or composite wood and steel construction. Covered cars are of 20 and of 30 tons capacity and are either all steel or composite wood and steel.

Flat cars, low sided, and 30 ton tank cars are occasionally built, and a 50 ton well wagon was recently constructed.

Capacity of Shops

The capacity of the car shops is 80 large passenger and 500 freight cars per year. Repairs work forms a large portion of the output, about 7 per cent. of the rolling stock always passing through the works for overhaul. Old stock is usually rebuilt at such times. Most of the freight cars are repaired on the open air tracks adjacent to the shops.

Every part of car is manufactured, except wheels and axles, tyres, springs, heating and brake equipments, and a few small accessories.

All passenger stock is fitted with the Westinghouse system of steam heating, when not equipped with a self-contained, and Westinghouse brakes.

The main shops consist of one row of buildings, comprising 16 bays, each 200-ft. long by 43-ft. wide. An electric traverser runs between these shops on the North side, and Saw Mill and Paint Shop on the South, in a shallow pit 780-ft. long by 55-ft. 10-ins. wide. The largest cars and, if necessary, locomotives can be taken by this traverser and moved to and from any shop desired.

Other Work

Car Works Frame Shop consists of 3 bays, one being arranged for heavy machines such as Punching Machines, Radial Drills, Shearing and Cropping Machines, Cold Saw and Plate Rolls. Axleboxes and brasses are machined 16 at a time, on planer.

Two 10 tons electric overhead cranes are arranged over the frame erecting bays and a light hand crane over the machines.

Hand pneumatic riveting and chipping and rivet burstingt ools are employed. The capacity of the shop is six-65-ft. frames at one time.

Car Works Smiths' Shop occupies 3 bays and is equipped with 64 air blown fires and two-10 cwt. and three-5 cwt. steam hammers. A Bretts electrically operated, drop stamping plant has been installed for mass production of repetition car parts, with falling hammers 7, 15 and 30 cwts. respectively.

The parts made include such forgings as truss rods, hand brake screws, brake block hangers, beam ends, levers and pull rods, bar frames, spring hangers, door fastenings, etc.

A coke fired case-hardening furnace is available, fitted with pyrometer.

The Machine Shop

Car Works Machine Shop is arranged in 3 bays, one bay with light overhead crane. Fitting benches occupy center of shop. Machinery consists of 8 Pillar and 4 Wall Radial Drills, Sensitive Drills, 2 Slotters, 3 Shapers, 2 Planers, Boring and Surfacing Machine, 2 Turret Lathes, 1 Capstan Lathe, taking bar stock to 2-in. dia. Heavy Car Brass Boring Machine, with capacity of 4 brasses at a time, Universal Milling Machine, many small General and Polishing Lathes, etc.

A drop testing plant, outside shop, is used for transverse testing of axles, the top being raised by means of a small steam engine.

Car Works Wheel and Axle Shop is in three bays, each 100-ft. long by 43-ft. wide, and is provided with facilities for turning tyres and journals of car wheels and axles, and for pressing and removing of wheels on and off axle seats.

The machines in use comprise two Wheel Lathes, three Axle Lathes, One Journal Grinding and Polishing Lathe, one Wheel Balancing Machine, Hydraulic Wheel Press, with 9-in. ram, and a 42-in. Car and Wagon, Putnam, Heavy Wheel Lathe, driven by 50 h.p. motor, the tailstock of lathe being operated by independent motor.

All operations of this Putnam lather are button controlled, and the machine can turn tyres of a pair of wheels simultaneously, at the rate of a pair per hour.

Wheels and Axles are raised and swung from one track to another at right angles, by air jacks, at three points in shop, instead of using turntables or crane.

Three hand worked 2 ton cranes are arranged overhead.

The Bogie Shop

Car Works Bogie Shop is arranged in two bays, each 100-ft. long by 43-ft. wide. There are several kinds of bogie in the P.M.R. service; a passenger car type with pressed steel frames, of 8-ft. and 10-ft. centers, and equalizing, a long bolster, and a built up type, termed the "Imperial," because first used under a car for the late Dowager Empress. Freight cars are fitted with either pressed steel framed type, with centers at 5-ft. 9-in., a M.C.B. bar framed diamond bogie, or a built up truss type, of local design.

Pneumatic hand tools are used in the shop, and the following machines are installed:—Radial Drills, Cold Saw, and Plate Planing Machine for bogie pressed sides. Two hand worked overhead cranes, of 4 and 2 tons capacity, run length of one bay, and a 2 ton crane in the other. A plate heating furnace is provided.

Arrangements are in progress to fit this shop with tyre heating furnace to shrink tyres on wheel centers. At present this is done in Loco. Machine Shop.

Various Shops

Carpenters' Shop is arranged in 6 bays, each 200-ft. long by 43-ft. wide. There is floor space, and equipment, to have 18 bodies of 65-ft. passenger cars in progress at one time.

The method adopted is to build up the bodies on horses, about 1-ft. from floor, and when complete, the whole is jacked up, steel underframe on bogies is run underneath, and bodies bolted down. The car is then completed on the spot, no overhead crane being used during operations.

There are two light cranes used for lowering heaters, etc., into cars. Pneumatic drills for holes up to 1-in. dia. are used for timber drilling.

Tailors' Shop, 150-ft. long by 42-ft. wide, is situated next to Carpenters' Shop. All upholstery work on car seats, berths, etc., is done, as well as lagging for heating boilers and pipes. Equipment consists of a number of sewing machines, electric irons, and a teasing machine for renovating horsehair.

The Paint Shop is situated opposite to Carpenters' Shop on the South side of traverser. It is 200-ft. long by 129-ft. wide and contains 6 tracks, with a capacity for about 15 cars, 65-ft., and 55-ft. long, at one time. Temperature of shop is kept at an even point for drying by the Westinghouse method.

Adjustable platforms, at sides of tracks, give easy facilities for painting and washing down cars.

Saw Mill

The Saw Mill is parallel to the Paint Shop and is in 3 bays totaling 129-ft. wide by 200-ft. in length, and is a well lighted and open shop. The whole of the machinery, as far as possible, is driven from underground shafting, shafting and motors being arranged in shallow pits. Belting and drives are generally out of sight and in all cases guarded. The arrangement gives plenty of floor space and room around machines to swing timber during the various operations. The floor is of concrete.

A steam driven log saw takes timber up to 3-ft. square, to cut into standard planks, and is the only steam driven machine in the shop. A 2-ton overhead crane running to outside of shop transports logs to machine.

Other machines comprise 3 Circular Saws, 3 Planing and Surfacing Machines with auto. feed and 2 with hand feed; 2 Double Spindle Circular Moulders, 2 Planing and Moulding, 2 Wood Turning Lathes, Tenoning Machine, Copying Lathe, Blind Style Mortising Machine, Chain Cutting and Mortising Machine, Hollow Chisel Mortising and Boring, 2 Moulding Machines, Auto. Gaining Machine Roller Feed Saw Bench, Band Saw, and a Single Speed Boring Machine.

Steam Drums, outside Saw Mill, are used for bending hoop sticks intended for car roofs. A timber Drying Shed is also available.

Air Brake Shops

Westinghouse Air Brake Shops.

A repair shop 50-ft. by 42-ft. is maintained for complete repairs to whole of Air brake equipment. A testing rack is arranged with facilities for testing 6 pumps at a time, steam being obtained from a stationary boiler.

Air is compressed and used in shop, being independent of other supply.

A test shop, 240-ft. long by 25-ft. wide, near track entrance to works, is used for complete train testing, the shop being a through one with single track.

In this shop there is a complete engine equipment for auto. and non. auto. working, arranged for drivers' instruction. A passenger car testing set is also arranged.

The steam heating of a train may also be tested at the same time as air brake equipment.

The rolling stock, in the future, is intended to use the double brake, and many of the freight cars are at present so fitted, but only automatic working is in use.

Heavy shunting locomotives do, however, now use the double brake.

Boiler Houses

Loco. Works Compressor Plant and Boiler House.

The equipment includes
1 Ingersoll Rand Compressor 12-in. by 10-in.
3 Chicago Pneu. Compressor 10-in. by 10-in.
2 Tongshan made Compressor.
All these are steam driven.

A hydraulic accumulator is installed and two horizontal duplex pumps.

The boiler house contains 4 sets of Babcock Wilcox water tube boilers, of 983 sp. ft. heating surface each, with space for an additional set.

Power House Boiler House contains 5 sets of Babcock Wilcox water tube boilers, of 983 sq. ft. heating surface each.

Car Works Compressor and Boiler House.

Compressor equipment consists of.... 1 Chicago Pneu. Compressor 10-in. by 10-in. 1 Consolidated Pneu. Compressor 10-in. by 12-in.

Both are steam driven.

The boiler house contains 4 Lancashire boilers and 1 set Babcock Wilcox water tube boilers, of 983 sq. ft. heating surface.

Stores Kept Full

Stores. All loco. and Car parts are stocked that it is usual to renew. Large parts such as wheels and axles, tyres, couplers, rough brass, sections, brick arches, brake blocks, beams, etc., are stocked in store yard.

The main store building is 410-ft. long by 33-ft. wide and is fitted up with concrete shelves and binns throughout, the binns being sub-divided when desirable.

A portion of the store is given over entirely to Westinghouse brake and heating equipment spares.

Floor space is available for spare side rods, motion bars, springs, casings and such parts, too large for shelves.

Another store building, 200-ft. by 54-ft., is used to store tubes, plates, angles, superheater elements, bars, blooms, etc. Pits are sunk into floor about 2-ft. deep, and tubes, bars, etc., carried upright in pits. Racks above and between pits keep stock in position.

Oil is stored in a separate building, fitted with tanks, near store.

100 in Offices

Offices. A two storied building contains the running department, clerical and drawing office staff, totalling about 100.

Apart from design of locos and cars, a considerable amount of work is done for loco sheds and works plant. Materials are tested on a machine fitted up in store.

The drawing office is provided with arc lamp printing frame, a photostat machine for direct reproduction, a photograph room, an oil testing bench, and a full sized model for laying down the Walschaert Gear.

Tongshan Running Shed is 272-ft. by 98-ft. 6-in. inside and was built in 1908. Six tracks enter at one end, spaced at 15-ft. -9-in. centers, and are arranged with pits 3-ft. deep, along whole length of shed.

The building is constructed of brick, with arched concrete roof. Smoke jacks are arranged at suitable distances.

Drop Pits

Drop pits for removing a pair of wheels is carried across two tracks. Ashdrop pits and hydrants for wetting ashes are situated outside shed. The shed can accommodate 20 locos and tenders, the heaviest engines being able to haul about 180 axles.

A "Whytes," single tank, double pump system, washout plant is in use, which permits boilers to be blown at 40-lbs pressure, and washed out and refilled with hot water, in about 4 to 6 hours.

Drop down pipes take off the blown off steam and water, through the main blow off line, into a filter, which, by a baffle, divides water and steam, the water passing to washout compartment of a tank, and the steam to refilling compartment.

Washing out water is then pumped, at about 90-lbs. pressure, through separate main and auxiliary pipes back to boiler, and washing out performed in a quick thorough way.

Refilling Process

Refilling is performed by pumping clean, hot, water from refilling compartment of tank back to boiler, this water being heated by steam, from blown off steam and water.

The pumps, running lightly, circulate hot, clean, water through separate pipes, connecting to washout and refilling lines, and so secures an instant supply of hot water, to delivery end of system. The temperature in the tanks is maintained at about 190 deg. F, by means of thermostat valves on steam heating pipes.

With this system, four boilers can be treated at once.

Duplex pumps are used for the washing out and refilling.

Washout plants, carrying out the same work, but of a less complicated type, have been designed and installed by Tongshan Works at some of the other loco. sheds.

The water supply of shed is carried from the works and is stored in an overhread tank of about 25,000 gallons capacity, near to shed.

The shed compresses its own air for use with hand tools, and an electric welding and oxyacetylene set is available for quick repairs. The end of the shed is used for repair work, and an overhead gantry of 1 ton capacity is arranged over two tracks, for lifting such parts as dome covers, cabs, feed water heaters, buffer beams, etc., when necessary.

Electrical Work

Electrical connections are arranged, so that drills, grinders, etc., may be used at any point in building, in addition to air tools.

Steam heating is available from radiators in and between pits, and shed is electrically lighted throughout. Electric welding and reinforcing is utilised to repair flats on tyres, worn hornblocks, boiler plates and flues, etc., all such welding being done in place.

Three vertical boilers supply steam for washout plant, shed heating, and air compressor.

A small machine shop, with power obtained from a steam engine, is situated at repair end of shed.

A 25 tons capacity, steam, break-down crane, is attached to the shed and can deal with derailments of the heaviest locos in service. It is fitted up with electric search light on jib and auxiliary portable lights. An oxyacetylene set is carried, for cutting wreckage apart when necessary.

Tongshan Works

The Locomotive and Carriage Works have been completely converted to electric drive and are fitted with motors to an aggregate of 1,600 horse power.

The Generating Station includes the following plant:

Two. 110 k.w., One. 220 k.w. and One. 500 k.w. direct driven steam set's Belliss and Morcom Engines, and Crompton Generators, Voltage 220, D.C. These are so arranged that either set can be run singly or all in parallel, thus giving a total of over 3,000 Amperes. For simplicity the two wire system has been adopted.

The Switchboard by Crompton consists of 20 panels, each feeder panel controlled by double pole circuit breakers.

The motors total 1,600 horse power, most of the machine tools are group driven, but there are many cases of individual drive.

There are 7 Electric Cranes with a lifting capacity of 10 to 45 tons. The lighting load aggregates 2,500 lamps of 20-1000 Watts. The work of the Electrical Department entails the maintenance of the Electrical Plant in Tongshan and all out stations. Train Lighting with a total of 195 coaches. Locomotive headlighting, 122 being equipped. Welding Plants of which there are three.

Telephones, a telephone exchange in the Works connecting all Departments, with a trunk line to The Kailan Mining Administration, capacity 150 lines, magneto call system being used.

Shortage in the Pigtail Crop

IF the American Silk Association can subsidize a Canton silk institute for the advancement of its own particular interests, why should not the American Cottonseed Oil Association spend a few millions in subsidizing the Northern Chinese to restore the pig-tail? We can almost guarantee that a few millions judiciously distributed will result in a crop of caudal appendages which will solve the difficulties of the cotton seed oil mills in America. The abandonment of the pig-tail by the Chinese and widespread revolutionary conditions of that country, have caused a famine of press cloth, a most necessary equipment of all cottonseed oil mills. The best quality of press cloth is made by weaving hair that comes from the heads of the Chinese. It even exceeds in quality that which is made of camel's hair, although the latter is used extensively for the purpose.

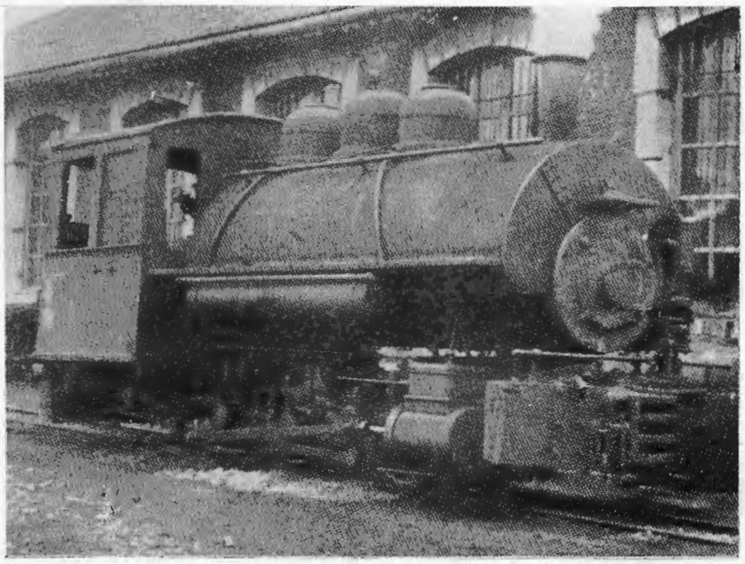
Camel's hair comes chiefly from Manchuria, and this industry also has been seriously affected by unsettled conditions in that part of China. The hair of the camels is not shorn, but it is gathered in the compounds where it has been shed by the animals. It is a meager and painstaking method of obtaining the material which is so highly prized for shawls and cloth-making purposes, but it affords a means of livelihood for many Chinese.

As yet no adequate substitute for Chinese human hair or camel's hair has been found for making press cloth, but experiments along this line are now being conducted. The hair from the tails of squirrels, which has often been substituted for camel's hair in the manufacture of paint brushes has been tried in the weaving and use of press cloth, but it is not found satisfactory in all respects, it is stated.

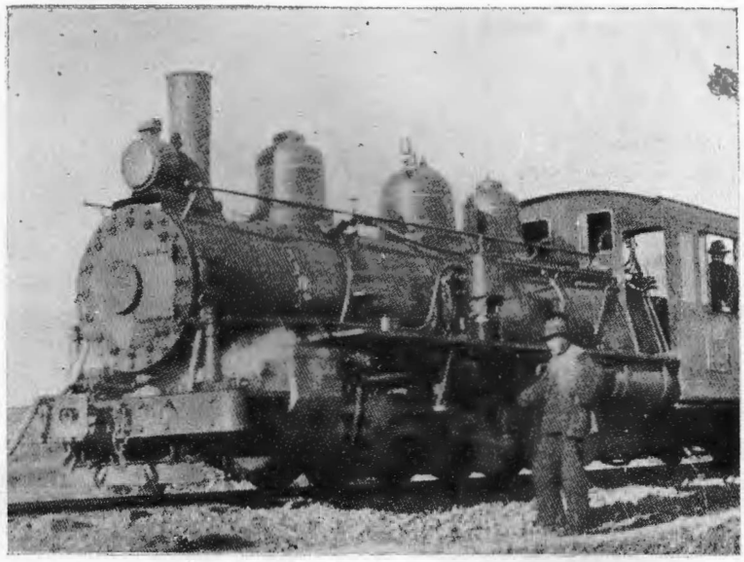
Another thing to be considered is that there is not enough squirrel tail hair available to meet the existing demands for press cloth by cottonseed oil mills.

The Chinese War Lords are overlooking a good bet. If Canton refuses to grow the pig-tail to save the American cottonseed oil industry, perhaps Chang Tso-lin might oblige.

Road-Building in Shantung.—According to the plan of the Highway Bureau of Shantung province, steps are being taken to construct motor roads (1) between Taierhchwang and Weihsien, (2) between Jihchao and Tsining, (3) between Tsangchow and Weihsien, (4) between Kiuhsien and Tsining, (5) between Litsing and Hotse and (6) between Taierhchwang and Tsining. The Litsing-Hotse road was already been completed and traffic opened. Preparations are now being made for the construction of the Taierhchwang-Weihsien road which will go through Ankiu, Chucheng, Luchow and Yihsien. Funds required for building this road are to be contributed by the districts *en route*.



Davenport 0-6-0 Locomotive Waiting to Take Out a Train



0-10-0 Locomotive, Road No. 22 on Test

The Yunnan-Kopei Railway

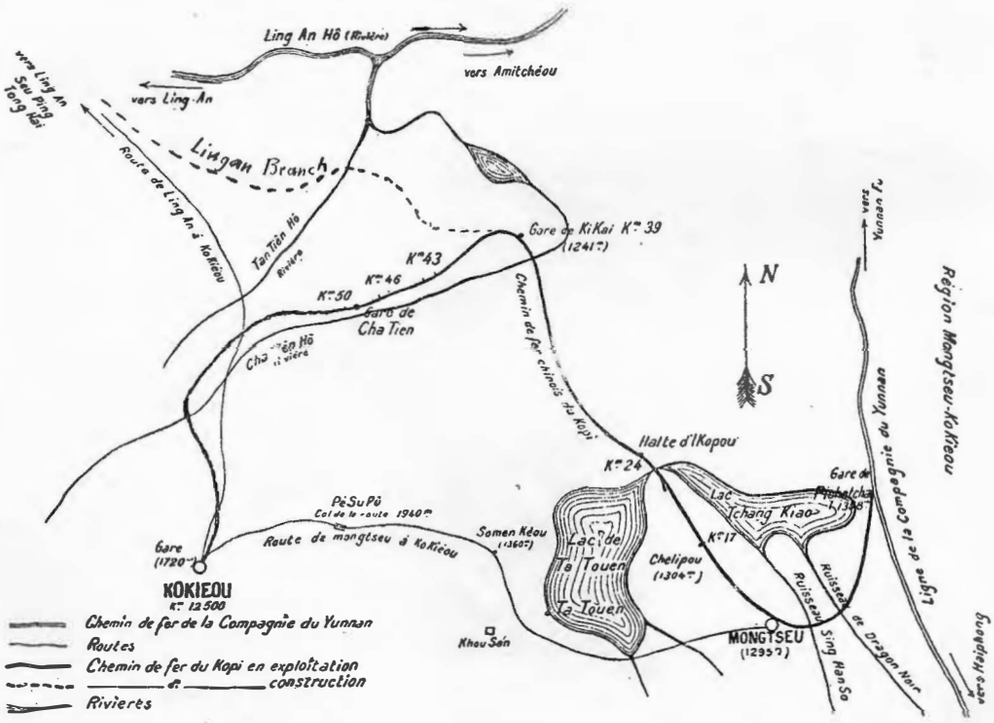
By E. P. Williams, Jr., of the Baldwin Locomotive Company

THE tin mines of Kokiu—situated in the southern central part of Yunnan, the southernmost province of China, and at an altitude of 5,640 feet—have been in operation for many hundreds of years, and until comparatively recently the shareholders have been content to transport the tin on bullock carts and pack horses. However, when the plans for building the French Railway Chemin de Fer de la Compagnie du Yunnan, between Haiphong, Tonkin and Yunnanfu were actually commenced, the idea of a light railway between Kokiu and Peichetchai, on the French Railway, was seriously considered.

A preliminary survey was made and estimates prepared, but it was not until 1915, when the price of tin started to rise to what was then unprecedented heights, that the construction was actually started under the leadership of Mr. Chen Ho-Ting, the present President of the Railway. The first seven miles between Peichetchai and Mengtse, one of the few treaty ports of Yunnan, were opened to traffic in 1917, and the line to Kokiu, a total length of 45 miles, was completed in 1921.

The construction and operation of the Railway, which is of 23 5/8-inch gauge, laid with 33-pound rails, is exceedingly difficult due to the severe service conditions. These include 3 per cent. grades, 230 feet reverse curves, and limits of height and width of 12 feet 11 inches and 8 feet 10 inches respectively.

From Peichetchai, which is about 4,500 feet above sea level, the railway descends into the plain of Mengtse, over 3 miles of 2.5 per cent. grade combined with 328 feet curves. It then runs over a right of way where there are numerous short grades of 2.2 per cent. and 2.8 per cent until mile 20 is reached, where there are 3 miles of 3 per cent grade and 394 feet curves. From Kikay, the halfway point and where the new line to Lingan will branch off, the road starts to climb. Until mill 41 is reached there are hardly 164 feet of straight track and the grades are continuous, varying between 2 per cent and 3 per cent with curves of 230 feet and 262 feet radius. In passing this section the road runs through 8 tunnels, the longest of which is just over 2,296 feet. Five of these tunnels are located on reverse curves, and tunnel No. 8 makes a complete half circle around a 295 feet curve over a 2.5 per cent grade. After passing mile 41 the line descends to Kokiu, there being only one tunnel and no exceptional grades or curves on this part of the line.



Map Showing Yunnan-Kopei Railway

In order to make an outlet for and open up a large agriculturally rich district, the Kopei Railway in 1921 began the construction of a line branching off at Kikay. This line will extend to Lingan, a large city on the old caravan road to Yunnanfu, noted for its potteries, and 40 miles away. The building of this branch line is under the direction of Mr. K. C. Li, and, although the work is difficult and has been much delayed by bandits, it is expected that it will be opened for traffic next year. The Kopei Railway,

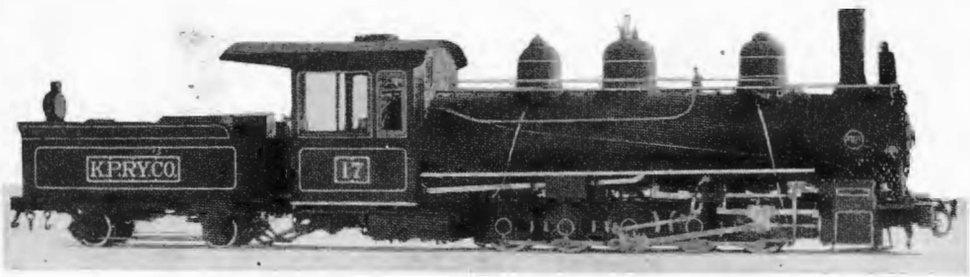
A Troop Train of 13 Cars Hauled by a Baldwin 0-10-0 Locomotive

0-8-0 Type Locomotive on a Test Run

which is intimately connected with the Yunnan Tin Company whose smelter is at Kokiu, is entirely Chinese owned and at the present time has for its President Mr. Chen Ho Ting; Vice-President, Mr. Chao Pei Chai; Traffic Manager, Mr. Chu Yu An, with Mr. K. C. Li, a Chinese engineer and Cornell graduate, in charge of the construction of the Lingan branch.

When it was first decided to build the railway, the money for its construction was obtained by contribution from the people who would expect to benefit thereby, the miners, fuel merchants, tin smelters, and the buyers; but in 1917 it was found that there would not be sufficient funds to complete the Railway, the final cost of which was over $5,000,000.00 Yunnan,

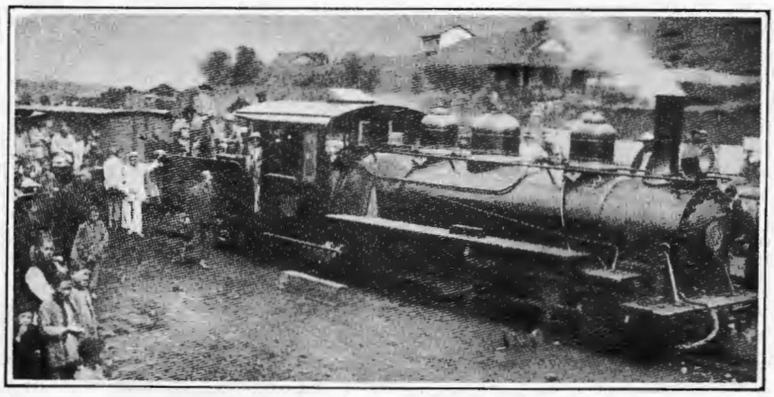
Running Shed and Repair Shop at Mengtse



Cylinders	13-in. by 16-in.	Grate Area	20.2 sq. ft.	Weight Total Engine	64,700-lb.
Drivers, Diam.	28-in.	Heating Surface	834 sq. ft.	Tractive Force	14,700-lb.
Steam Pressure	180-lb.	Weight on Drivers	64,700-lb.		

and a bank was established having the Railway as its assets. This institution, known as the Yunnan Kopei Railway Bank, with headquarters at Kokiu and branches at Yunnanfu and Mengtse, has on its directorate many of the gentlemen that are also on the board of the Railway and the Tin Company. Its purpose was primarily the issuing of paper money for the work on the Railway. Permission was obtained from the Tuchun of the Province, Gen. Tang Chi-yao, to issue $500,000.00 Yunnan in notes. The first issue was most interesting in the printing arrangement, since instead of the regular, numerals in the corners these notes have "A" for five, "B" for ten and "C" for twenty, the one dollar notes being made by cutting the

Rolling Stock of the Yunnan-Kopei Railway. Erection of the 0-10-0 Type Baldwin Locomotives



Locomotive Number 17 on Her First Trip to Pechetchai Junction with the Yunnan Railway

corners off of any of these notes. Later when more money was required, permission was obtained from the Tuchun for the issuance of another $500,000.00, and the notes were made by the American Bank Note Company. These notes are only negotiable along the Kopei Railway, where paper money is entirely in vogue, even to the ten and twenty cent pieces.

After the completion of the Railway and for its upkeep the Share Collecting Bureau was established at Kokiu, where all tin for export is taken for weighing and examination. For each Chan, about one ten and a quarter, the Railway collects about 100 Taels—25 Taels from the Smelters, 25 Taels from the Buyers, 7.5 Taels from the Charcoal Burners, and 42.5 Taels from the Tin Miners. This insures the Railway an annual income of from $350,000.00 to $600,000.00 Yunnan from this source alone, in addition to the receipts from passengers and miscellaneous freight.

The Railway shops at present located at Mengtse are able to take care of general car and locomotive repairs, but it is proposed to move them to Kikay as soon as the Lingan line is opened to traffic, and at that time to fit the shops with up-to-date machinery consistent with the repair work that they will be called upon to do.

The passenger carrying stock of the Railway consists of first and second class, third class, and fourth class cars built by the Yangtze Engineering Works, Hankow, China. Box cars and coal cars of 7.5 tons and 10 tons capacity are used. These cars have been supplied by American and French builders and the Yangtze Engineering Works of China. All cars are of the four wheeled-bogie type and are fitted with link and pin couplers.

The motive power of the Railway until 1925 consisted of 16 locomotives, all of approximately 9,000 pounds tractive force, and built by various makers as follows: 8 of the 0-6-0 Saddle Tank Type built by the Davenport Locomotive Works, U.S.A.; 4 of the 2-6-0 Side Tank Type built by Batingnolles, France; 4 of the 0-8-0 Side Tank Type Built by The Baldwin Locomotive Works, U.S.A.

As the locomotives in use did not have sufficient power to meet the growing needs of the railway, Mr. Chen, the President, requested The Baldwin Locomotive Works to design a locomotive to meet the Railway's unusual service conditions. To meet the demand for increased hauling capacity combined with a restricted loading gauge, a ten-coupled design with separate tender was proposed. An order for six locomotives was placed. These locomotives have proved capable of hauling 75-80 metric tons of cars and lading over the grades and curves of the Railway, at the same time maintaining a minimum speed of 9 miles per hour. It is also interesting to note that while hauling almost double the load of the smaller engines, the 0-10-0 locomotives show a very appreciable saving in fuel and water. These locomotives have proven so successful that the Railway has recently purchased 6 duplicate locomotives.

Shing Mun Valley Contract, Hongkong

THE construction of two tunnels and an open Conduit joining them, together with a Gauge Basin at the Southern end, is only part of the scheme designed to bring the waters of the Shing Mun River through and across the hills of the New Territories, which are leased by the Chinese to the British, to the Cities of Kowloon and Hongkong. The length of the North and South Tunnels are 2,160 and 4,680 feet respectively, and the South Conduit with tunnel approaches 2,000 feet.

Tenders were called by the Public Works Department of Hongkong in 1924, and the firm of Sir. W. G. Armstrong, Whitworth & Co., Ltd. were awarded the contract on 25th November of the same year.

The specified time for the completion of the works was approximately 18 months, but owing to considerable sickness amongst the European Staff and the Chinese Labour, a general Strike that affected the whole of the Colony for several months, and the fact that difficult and water-bearing ground was encountered in the North Tunnel for several hundred feet, the completion of the works was delayed about four months. The excavation for the South Tunnel Approaches and also for the South Conduit was commenced in January, 1925, and tunnelling was commenced as follows :—

North Tunnel - South end - April 1925
South ,, - North ,, - February 1925
South ,, - South ,, - April 1925

(a) The boring of the South Tunnel, which is the longest, was started from both ends, but the North Tunnel was only attached from the South end, as the North Face was very inaccessible, the side of the hill being almost sheer in this locality, and ths length of the tunnel being less than half of that of the South Tunnel.

The ground through which this tunnel was being driven was however found to be soft and water-bearing, which necessitated a considerable amount of heavy timbering and subsequent lining with concrete, this delayed the progress to such an extent that it was decided in November, 1925, to open up the North Face and drive from both ends. Owing, however, to certain modifications by the Engineers of the Plan for the Approach at this end, the heading was not commenced until June, 1926. The South Tunnel Headings were joined up early in July, 1926, whilst those for the North Tunnel were joined in the middle of August, 1926.

The error in the alignment in both tunnels was practically nil, being under 2 inches in each case, this was a very satisfactory result considering the rough and inaccessible country over which the surveys had to be made.

The drilling machines used were of the Leyner Drifter Type, with 1¼" round hollow steel drills, driven by Compressed Air. The pressure at the Power House was kept at 100 lbs. per sq. inch which resulted in a pressure of about 90 lbs. at the drill. The air main was 3" dia. the maximum length being over 3,000 feet.

A jet of water was maintained through the drills at a pressure of about 30 lbs, which eliminated dust, kept the holes clean and the drills cool.

Two drilling machines were worked in each face, mounted on a horizontal bar.

The length of the holes drilled varied from 3 feet to 5 feet, and the number in each round from 28 to 38 according to the class of rock encountered.

The holes for the cut were drilled round a central area about 4' 6" across with each pair of holes aiming to meet at a common point of 3' 6" to 5' from the Face.

The cut holes were loaded and fixed first and then the remainder of the holes.

Blasting Gelatine with electric detonators were used for the cut and Gelignite for the remainder, which were fired electrically in some cases, and by time fuze in others.

The average amount of explosives used throughout the work was 9 lbs per lin. ft of tunnel.

The material encountered throughout the full length of the South Tunnel was hard granite, but in the North Tunnel this was intermixed with decomposed granite and dykes of shale, which latter were very treacherous when exposed to the Air. The Power for driving the tunnels was provided by three single acting compressors with a capacity of 450 cubic feet of free air per minute, delivering at a pressure of 100 lbs per sq. inch. These were provided with after-coolers and receivers and belt-driven by three 115 H. P. Semi-diesel Engines. A Portable Air Compressor was installed at the North Face of the North Tunnel, which was capable of running one Leyner Drilling Machine at 80 lbs pressure.

Two Leyner Drill Sharpening Machines with Oil Furnaces were employed for sharpening the drills, as many as 600 drills were being dealt with by each machine in 24 hours.

Two electric generating sets with a total capacity of 16 K. W. and driven by Oil Engines were used for lighting and ventilating the tunnels. The whole of this electrical plant was duplicated to provide against stoppage of work by breakdown in the lighting and ventilating system.

The Cableways, 3,000 feet long each, were employed for transporting machinery, materials and stores from the main roads to the Works. These had a capacity of 5 tons, per hour with a maximum individual load of 5 cwts. per carrier.

Worthington Pumps, driven by compressed air, were employed for dealing with the water in the tunnels.

The excavation from the tunnels was handled by nine skips of 1 c.y. capacity running on a track with a gauge of 2 feet. Jackhammers were employed for poling back in the tunnels where the concrete lining was required, and also where the original headings had not been excavated to the finished section.

The average progress in all headings was 36 feet per week, the best weekly output being 55 feet in one week, working 3 eight-hour shifts each 24 hours.

Chen Hwa Paint Factory, Shanghai.—The Chen Hwa Paint Co., Ltd., with an office at 271-2 North Soochow Creek, has its factory at Tan Tze Wan, Ferry Road, Shanghai, covering a total area of 15 *mow*. The company was founded in 1918 by C. P. Loh, and K. C. Shao with a fixed capital of Tls. 200,000 and a circulating capital of Tls. 300,000; its output last year was valued at over $300,000. The company made a profit of $24,000. More than a hundred workmen are employed in the factory, which is under the supervision of Prof. Z. C. Dage, of the National Institute of Technology, who also serves as chief engineer.

The factory manufactures ceruse or white lead, using the piglead produced at Changsha, Hunan province, as raw material. The raw material comes in bars of 140-150 catties each, costing Tls. 23 a piece. It is first made into sponge-lead and is then rendered soluble by soaking in vinegar. It is further treated with chemicals and precipitated in a white pasty form. The factory turns out 20 piculs of this pasty stuff every 24 hours. To make it into ceruse, the pasty stuff is wrapped in cloth and pressed into a solid cake to squeeze out the water content. The solid cake is further dried by baking before it becomes ceruse.

Another white pigment is manufactured from metallic zinc produced at Sungpai, Hunan province. In this case, the raw material is simply heated on hearths until it turns into small particles, which are delivered to another department for grinding. This department occupies two floors. On the lower floor, a grainding machine is installed, to which is attached a fanning machine. When the white particles are ground in the grinding machine, the fanning machine is also set in motion so as to blow the fine powder through an iron tube to the upper floor, while the heavier particles are returned to the grinding machine for further grinding. The fine powder is zinc oxide.

Red lead is also manufactured in the factory through a similar process, using piglead as raw material. The latter is first melted on a hearth at a very high temperature. By raising the temperature and continuing heating, the lead finally turns into brown particles, which are ground in the grinding machines and baked. The resulting fine powder is of a red color and is known as red lead.

"Red iron oxide" a stuff for preventing iron and steel from rusting, is manufactured from green vitriol produced at Poshan, Shantung province. The raw material is simply burned into fine particles to form the above named product.

White powder for white—washing walls is manufactured from white rocks produced in the mountains of Huchow. The rocks are ground with grinding stones together with water.

The oil refining department of the factory is equipped with large boilers to hold 7,000 catties of oil. Linseed oil produced at Kalgan is used. The oil in the boiler is heated to boiling point.

In the boiler, a stirring device is set in motion to bring the dregs up to the surface. This refined oil is used to make white paint by mixing with ceruse, or to make paints of any other colors by adding other coloring matter. The Chen Hwa Paint Co., manufactures paints of all colors and varieties, varnishes, stains, and enamels for sale at prices considerably lower than those of imported goods.

Wireless Station in Nanking.—The wireless station at Pehchikoh, Nanking, capital of Kiangsu province, will soon be completed at a total cost of about $40,000. All equipment installed at the station is Chinese make, except the dynamo, which was ordered from America. The station will accept commercial messages. A radio service will also be attached to the station to communicate with Woosung and Shanghai. The new station will be formally inaugurated on November 28.

Shanghai-Chuansha Light Railway Company—A regular launch service between Tatu'an and Chuansha via Santun Er'htu'an, Liutsaowan, Nanwei, Szutu'ants'ang, Chuchiachiao, and Chitsao was established by the Shanghai-Chuansha Light Railway Company, on November 5, 1926. The launch will accommodate approximately 40 passengers per trip and the fare from Chuansha to Chuchiachiao is ten cents each. The regular light railway fares from Chuansha to Shanghai are 69 cents each first class and 39 cents second class. The construction of the light railway line from Wangchiahsiang to Chuansha, a distance of 10 *li*, was completed on July 10, 1926. The company was originally capitalized at $150,000, but another $150,000 at $20 a share is being raised.

Hu-Hai Railway.—The terminal point of the new Hulan-Hailun Railway was originally Sungpu, 8 *li* from the Sungari river at Harbin. This distance had to be covered by cart. For the convenience of passengers and for transportation of goods, the railway has now built a branch line 7½ kilometers in length to the Sungari, the terminus being Machiankao, opposite Harbin. Passenger and freight traffic is now in operation over a total length of 27½ kilometers. Workmen's trains go still farther, about 60 kilometers. Construction has been carried on under trying conditions, heavy rainfall, early frost, snowfall, hard ground, absence of roads, sand, wood and other needed construction materials. In 1927 it is expected the line will be completed to Suihua, 120 kilometres from Harbin, not counting sidings at various stations.

New Docking Facilities in Shanghai.—New docks for the unloading of coal are being built at Kiangyin, Kiangsu, by the Kailan Sales Agency, 6 Szechuen Road, Shanghai. A hulk is in process of construction to serve as the landing point for coal for transhipment to the factories in Wusih and Changchow by barge. A part of the river front has been raised some 15 feet and completely bunded. The pier and the hulk will together cost approximately $200,000, and a godown for storage purposes approximately $100,000. The new project will make it unnecessary to bring coal into Shanghai for transhipment to Wusih and Changchow by the Shanghai-Nanking Railway.

New Air Lines for Japan.—An order for a fleet of twenty-five large airplanes to cost $1,250,000 has been received by a British firm from Japan. The machines will accommodate from fifteen to twenty passengers each and have a speed of more than 100 miles an hour. They will be used in regular service on the new Japanese routes to be opened next year. Each plane will be driven by two Napier engines developing 1,000 horse-power.

It also became known to-day that large orders for military aircraft had been placed by Japan with other firms, but details have been kept secret.

Central Asia Railway.—Work will begin early next year on two great engineering projects—the Frunze-Semi Paliatinsk Railroad and Dnieper dam and power plant and the Volga-Don Canal.

The railroad is the most important in political and economic value. The Frunze line, formerly called the Pishek, is linked as a branch road to Tashkent, which will be the administrative centre of the new line in North Central Turkestan. Semi-Paliatinsk is the present terminus of the branch from the junction of the Trans-Siberian at Novonicolaevsk.

The road will be 1,500 kilometers long, will cost 150,000,000 rubles and is to be completed in four or five years. It will border the frontier of the Chiness outer Mongolia region, the ancient Chinese caravan junction city of Kuldja, whose trade it is expected to tap, and along the pass cut by the River Almata through the Heavenly Mountains, which from the frontier.

This railroad will convey Siberian grain, lumber, etc., to Central Asia, which thus will be progressively devoted to the cultivation of cotton.

It will further open the partly unexplored region of the Altai range, which here is believed to be one of the world's richest in minerals.

The Dneiper River project contemplates the final production of 650,000 horse-power, but the initial program is limited to the installation of three turbines of 50,000 horse-power each. Chief Engineer Gunter declared to-day that turbines of this size are not made outside of America, but he did not say definitely whether they would be ordered there.

The Dnieper project will cost from 10,000,000 to 20,000,000 rubles.

The canal linking the Volga in the neighborhood of Ulyanovsk (formerly Simbirsk) with the Don, northeast of Rostoff, ninety-seven kilometers long, will permit the cheaper export of lumber from the vast forests bordering Kama on the Upper Volga.

It was contemplated long before the war, when a French engineer reported favorably on its possibilities, but it has been studied in detail only since 1922. A special board appointed by the Soviet Central Executive Committee is expected soon to make a final choice between the two alternative schemes and plans are made to begin work after the Spring thaw.

Pericle A. Chien

R. 3/1/27

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

上海仁記路拾六號

遠東時報

FIFTEEN YEARS OF FAILURE

BY GEORGE E. SOKOLSKY

INEVITABILITY OF A FAR EASTERN WAR

ECONOMIC CRISIS IN JAPAN

RAMA VI. BRIDGE

SOME CONDITIONS IN JAPAN AND CHINA

RISE IN THE COTTON INDUSTRY OF JAPAN

Vol. XXIII | April, 1927 | No. 4

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Pivoted counterbalanced spout with moderate vertical range. Levers permit operation from ground or tender.

Outside rods, easily adjustable. Column revolves on steel ball pivot.

Automatically and positively locked.

Manual as well as hydraulic valve control insures against valve sticking.

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Catalog 400.1 is a complete treatise on railway water crane construction and operation. It contains a wealth of extremely interesting technical data. Copy will be gladly sent to interested parties gratis.

No. 12 Telescopic Spout Crane in use on the Maine Central Railroad in the U.S.A.

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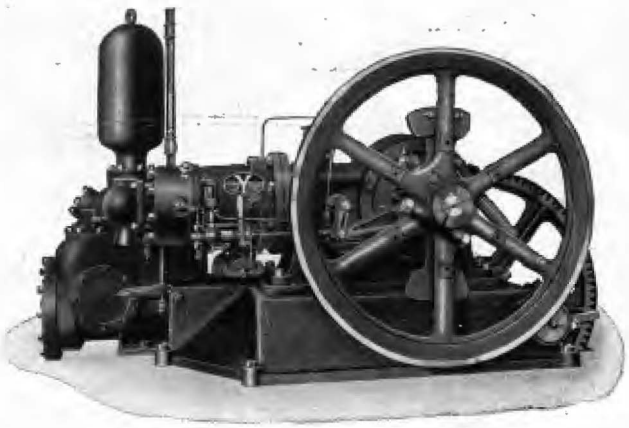
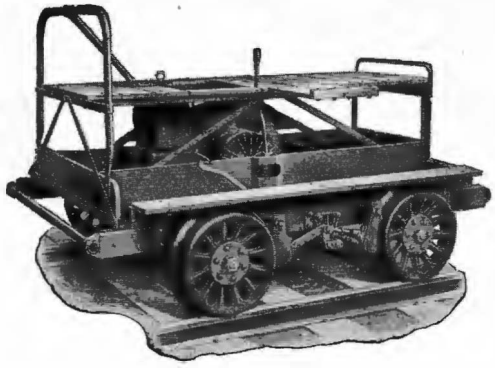
The pump unit shown below comprises a Fairbanks-Morse Type "Y" oil engine and poston pattern pump in a direct geared combination. This outfit is built in the 10, 15, 20 and 25 H.P. sizes, with capacities ranging up to 400 Imperial gallons per minute. Ideal for railway water station use.

The complete line of Fairbanks-Morse machinery comprises stationary and marine Diesel engines in sizes up to 720 H.P., pumps of all classes, electric motors and generators, electric lighting plants, automatic electric water plants, windmills and railway specialties.



At the right is shown a No. 44 railway motor trolley—a positive chain drive, indestructible clutch, powerful single cylinder water cooled engine. This is but one of many types which we built for all classes of service.



Engineering Notes

Arcade to be Constructed at Shanghai, China.—The construction of an arcade is proposed at Shanghai, which will house about 200 stores, according to Acting Trade Commissioner G. C. Howard. The area of the site is approximately 21 *mow*, or roughly 3½ acres, with approximate dimensions of 325 feet north to south, and 400 feet east to west. A square of buildings accessible to 4 roads, will form an inclosure within which 6 blocks of buildings will be accessible by 9 entrance porches. These buildings will be between three and five stories high, and will be equipped with electric passenger lifts and escalators. On the upper floors there will be a modern hotel, with dining room, grill room, ball room, Chinese tea houses, bath houses, etc., and on the topmost floors will be apartment houses catering to Chinese business men.

City of Antung to Build Higher Embankment Along Water Front.—The city of Antung, Fengtien Province, China, has decided to build a higher embankment along the water front, reports Vice-Consul A. I. Ward, Mukden. The embankment is to be raised about 6 feet from its former height, which work will involve a period of four or five years. The cost of this undertaking is estimated at 1,500,000 gold yen. (The yen is now worth $0.50.)

Subway Construction in Japan.—It is expected that the subway between Asakusa and Uyeno, Tokyo, Japan, will be completed and opened for operation in July, 1927, according to Howard B. Titus, in the office of the Commercial Attache, Tokyo. To date 6,000,000 yen has been expended on this undertaking, half for materials and half for construction work. (The yen is now worth $0.49.) Plans for the contruction of a subway between Uyeno and Manseibashi, Tokyo, have been completed and the contracts will be let in March. The name of the company to address in this connection is available under reference Japan No. 47002.

Extension of Chinese Railways Proposed.—It has been definitely decided to construct a railway line from Hailungcheng, the terminus of the Mukden-Hailungcheng Railway, now under construction, to Kirin, the capital city of Kirin Province, which is now the terminus of the Kirin-Changchun Railway, and which will be the terminus of the Kirin-Tunhua Railway also under construction. Thus Kirin will be the junction point of three important railways in Manchuria. The length of the line will be about 150 miles and it will touch the two important cities of Pan Shih and Kwan Kai. (Consul Samuel Sokobin, Mukden.)

Five Dams to be Constructed at Osaka, Japan.—A plan has been devised to dam the large streams of the Yodo River and divert the water into the laterial canals, according to Consul E. R. Dickover, Kobe, Japan. There are to be five dams as follows: The Dojima River, 192 feet long; the Tosabori River, 192 feet; the Nagahori River, 120 feet; the Dotonbori River, 120 feet; and the Edobori River, 55 feet. As the engineering department of the city desires dames which can be opened and closed quickly and which will not detract from the scenic values of the city, Taintor gates are to be used in connection with ferro-concrete bridges.

Shanghai-Paoshan Electric Company.—The Shanghai-Paoshan Electric Company is being organized by a group of 16 Shanghai merchants with a temporary office at A112 Peking Road, Shanghai. The company will contruct street car lines to conrect the Shanghai and Paoshan districts. The first line to be constructed will be in Chapei, Shanghai, from Jukong Road to Kwangfu Road, and then from Chapei to Wentsaopin, thence to Chenju and Nanziang. The company is capitalized at $1,500,000 at $100 per share, to be paid in 4 instalments, bearing 6 per cent interest per annum. The rate of interest will be increased to 8 per cent per annum when the company is formally open for business. The net profit of the company will be appropriated as follows: 5 per cent as reserve fund and the remainder after paying the 8 per cent official interest on shares to be divided into 14 shares, 11 shares to be appropriated as bonus to shareholders, 1 share as bonus to promoters, and 2 shares as bonus to executives and staff.

A Chinese Trawler.—What is reported to be the first motor trawler built in China was launched at Shanghai recently. It is 125-ft. in length, with a beam of 23-ft. and a depth of 13-ft., the Diesel machinery installation being of 360 b.h.p. to give a speed of 10 knots.

A Singapore-Built Motor Launch for Service on the Tenasserim River.—An interesting motor launch was recently completed at Thornycroft's Singapore yard for service on the Tenasserim River, where she will be used principally for conveying officials of the Austral Malay Tin Company between Mergui and the mines.

In the construction consideration had to be given not only to the climatic conditions, as extreme heat is experienced during the summer months, necessitating a boat providing the maximum of ventilation and comfort, but also to the rough waters which are to be encountered, particularly when crossing the bar at Mergui (Lower Burma) during the monsoon period.

Opportunities for testing her seaworthiness were quickly forthcoming, for on delivery the launch was run from Singapore to Mergui, a distance of nearly a thousand miles, intermediate stops being made at Part Weld and Penang. The Thornycroft 36 b.h.p. engine ran throughout without hesitation, and the bad weather met with during the voyage proved the "Austral" to be an excellent sea boat with a speed of over 9 knots.

The dimensions are: Length 40-ft., beam 8-ft. 6-ins., and draft 2-ft. 6-ins., the displacement being 5.25 tons. The boat presents an attractive appearance, and is of a useful type which might be employed with considerable advantage in other tropical districts.

Petters, Ltd.—Mr. K. D. Campbell, late Sales Manager of the Campbell Gas & Oil Engine Co. Halifax, has been appointed to a similar position with Petters (Ipswich) Limited, Ipswich Works, Ipswich.

Plans for Electrification of Japanese Railways.—The chief of the electrical bureau of the Railway Office, Tokyo, has announced some of the plans for electrifying certain sections of the railways in Japan, including the sections in the Tokyo region between Kozu, in Kanagawa Prefecture, and Numadzu, in Shizuoka Prefecture, and between Kokubunji, in Tokyo Prefecture, and Kofu, in Yamanashi Prefecture; in the Osaka region, the section between Otsu, in Shiga Prefecture, and Akashi, in Hyogo Prefecture.

The electrification of the Otsu-Akashi line will be started in 1929 and completed in 1932, and will involve a total estimated expenditure of 13,000,000 yen (about $6,480,000). The Kozu-Numadzu electrification also will be started in 1929. In order to meet the requirements for electrication in the Kwanto section of the country (the northern half of the main island), five electric power stations will be established. Among these will be a great power station at Shimanogawa, in the Niigata Prefecture on the northwest coast. The estimate for its construction has been increased from 36,218,000 yen to 58,545,000 yen (about $18,055,000 to about $29,185,000).

Although ultimately it is planned to use electric locomotives for both passenger and freight service, until the general financial conditions improve considerably, electric locomotives will be used only for passenger traffic. Owing to the unsatisfactory general financial condition, the work will be spread over a period of about nine years, instead of two years, asoriginally planned.

Shale-Oil Industry in Japan.—At the Fushun Collieries, Fushun, Fengtien Province, late in September, 1926, the first fire was built under the recently constructed experimental shale-oil distillation furnace, and oil was drawn off October 7. In all, 48 furnaces are planned, each to hold 40 tons of oil shale and to be 3 feet in diameter and 50 feet in height. After considerable experimentation it was decided to adopt an internal heating system in preference to the Scotch, and method has been devised whereby the gas will be returned to the furnace and used more than once. An appropriation of about $145,000 was made for the initial undertaking.

Yea Zung Tobacco Co., Ltd., Shanghai.—Eight new brands of cigarettes besides two old brands, are being manufactured and marketed by the Yea Zing Tobacco Co., Ltd. 114 Jun An Li, Rue Porte de L'Quest, Shanghai. The company is capitalized at $500,000 at $100 per share. It is equipped with 7 cigarette-manufacturing machines of French make. The manager is Wang Tai-su.

Motor Service between Tientsin and Paoti.—A motor-bus service between Tientsin and Paoti, a district in Chihli province, was started on November 1. It passes through three intervening stations, Meichang, Tsuihwang and Takowtun and takes four hours to complete. The charge for each passenger is $2.40 for one through trip, and $20 for a special car. Two regular services start from each end every day.

Vehicles in Hsuchow—Good roads are now being built in Tungshan, the first district of Hsuchowfu, Kiangsu province, and will be completed in the course of a few months, when carriages and motor cars will be introduced. At present, the city is not fit for modern vehicles. The streets are narrow and the pavements uneven, inconvenient even for ricsha pulling.

Richas were introduced into Hsuchow after the building of the Tientsin-Pukow Railway. They number at present over 300, being for public hire in the city or outside the city. The prevailing vehicles in the district are "ox-carts, and single-wheeled hand-carts. These were the only means of communications before the Republic, apart from horses and donkeys, and remains popular to this day. Ox-carts have four wheels, iron-tyred, and a wooden frame, or body, five *chih* in width and two *chih* above the ground, drawn by oxen or horses. These carts are very useful to farmers, being used to carry fertiliser, farm products, building stones, etc.

Farmers owning 10-20 *mow* of land usually have at least one, which, when not needed, is sometimes hired out to take building stones to the city. Single-wheeled handcarts have very big wheels, projecting above the frame, or body, thus dividing it into two parts, one on the right and the other on the left. These handcarts serve for the conveyance of passengers as well as goods, two passengers sitting one on each side of the frame. They are still used for country travel.

Hulan-Hailun Railway.—The Hulan-Hailun Railway, Heilungkiang province, was formally opened to traffic on January 23. Traffic on the railway is now open as far as Suihwa. Construction work on the line north of Suihwa has been delayed.

Long Distance Transportation Companies.—Shanghai is connected with a number of outports by light railways and motor buses, besides railway and steamship lines. There are two light railway companies, namely, the Shanghai-Nanwei Light Railway Company, Limited, and the Shanghai-Chuansha Light Railway Company, Limited. There are two motor bus companies, namely, the Shanghai-Taichong Motor Bus Company, Limited, and the Shanghai-Minghong-Cheling Motor Bus Company, Limited. The Shanghai Nanwei Light Railway Line originally operated motor buses, but in the spring of 1925 adopted the light railway system. The Shanghai-Chuansha line which had originally planned to run motor buses finally adopted in the fall of 1925 the light railway system, following the example of the Shanghai-Nanwei Light Railway Company.

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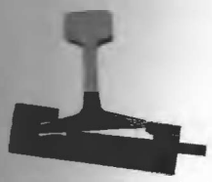
Vol. XXIII May, 1927 No. 5

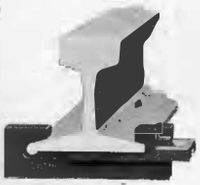
SHANGHAI, PEKING, TOKYO AND MANILA

Bethlehem Specialities for Steam Railways



Hook small end of yoke on rail base

Raise anchor level with rail base

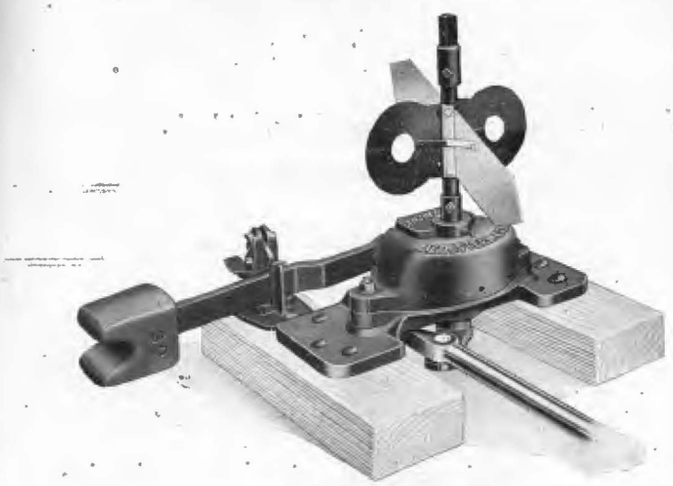


Drive key

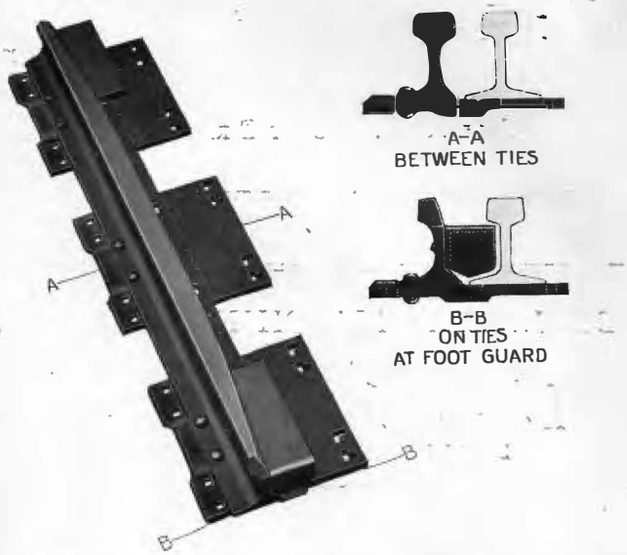
The Bethco Rail Anchor is a simple compact device, easily applied, which will prevent new, rerolled old, worn or corroded rails from creeping. It is a two-piece anchor with a positive take-up action which only two pieces can provide, but is so constructed that the pieces cannot become separated in shipping, distributing or installing. The broad flat face bears full-length against the tie, distributing the load with the least possible danger of cutting. The anchor may be easily installed, any hammer, rail chisel, spike maul or similar tool sufficing. Folder 144 will be sent on request.

Sectional and end views of Bethco Rail Anchor showing how the wedging action occurs.

Bethlehem Gage Rods, Design 855 and 856, are used to prevent track spread, lengthen tie life, and hold the track to gage on curves—all labor saving features. End adjustment provides speedy installation and ease in drawing up. Design 855, Non-Insulated Type, may be changed quickly and easily to Design 856, Insulated Type, by changing the clip. Bethlehem Gage Rods, used for temporary tracks and repair work, shorten the time of "out of commission" tracks.



New Century Switch Stand, Model 51-A, illustrated above, is a ruggedly built stand of unusually heavy construction. The main working parts are of drop forged steel and fine quality malleable iron. Either switch point may be adjusted independently of the other without disconnecting the stand from the switch, an exclusive patented Bethlehem feature. This stand has been designated as the standard on many large American railroads, and as such has given many years of excellent service.



Bethlehem Hook Flange Guard Rail, Design 750, is a self-contained unit ready for installation. It consists of a rolled rail fitted with heavy base plates. The depressed flange under the main rail receive the weight of the train, thus preventing the guard from raising up or overturning. The upturned edges of the heavy base plates prevent side movement.

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BETHLEHEM

Economic Bases for New Railways in Manchuria

By C. Walter Young, M.A.

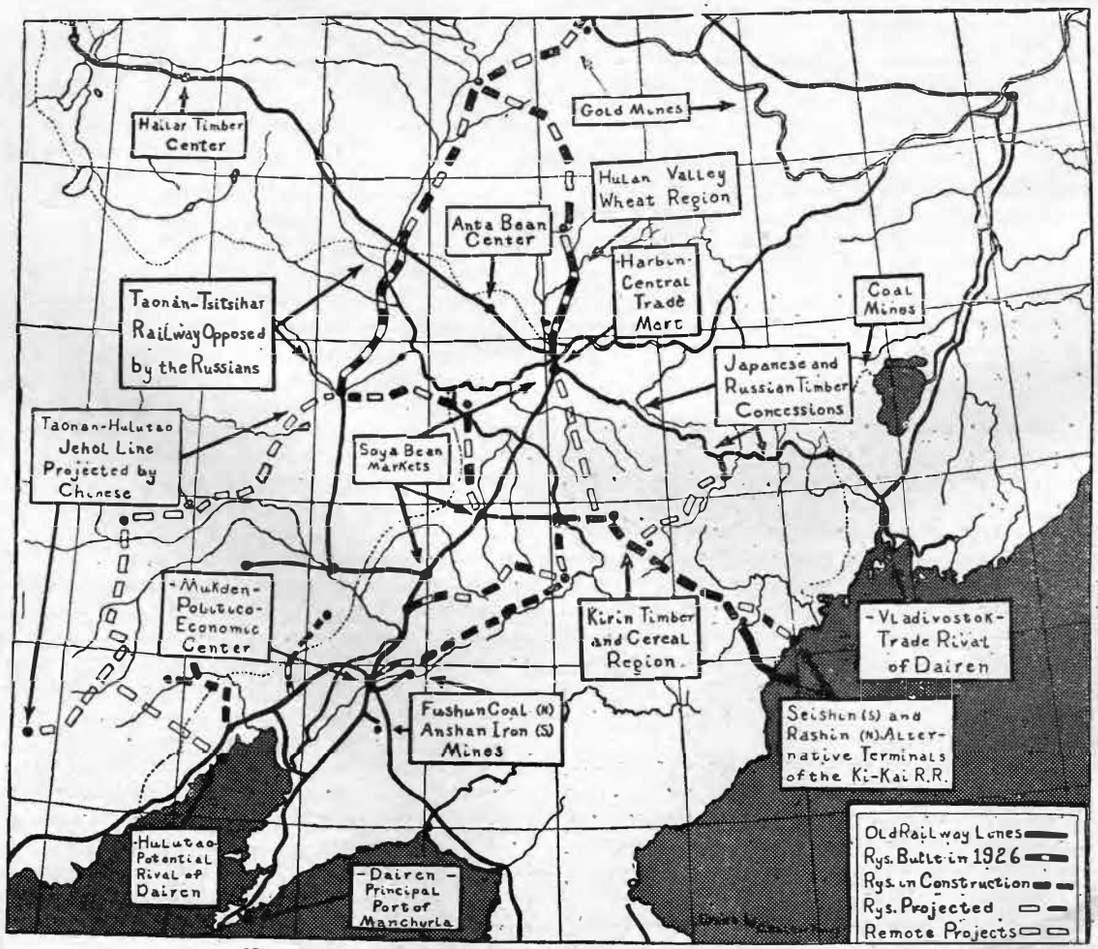
NOWHERE in the Far East during the past few years has there been more railway construction than in Manchuria. Consequently, in many quarters there is the current query, and as often assertion, that in Manchuria railways are being constructed by the interested parties principally, if not solely, for strategic reasons. Every railway which pierces a frontier, hitherto undeveloped, rich in potential resources, over which two or more countries are competing for the produce of its lands, must of necessity have some strategic significance. Too often, however, the strategic motives are given stress far beyond just desert, principally by those who seek in sensationalism to gain a hearing for what otherwise might seem dull reading to a public which feeds on news features.

New railways in Manchuria are being constructed through regions which formerly have had to depend on the cumbrous cart traffic or slow river boat method of transporting produce to markets, markets which depend for their utility on their railway connections with the two principal ports, Dairen and Vladivostok, the chief assembling and distributing centers for the South Manchuria and the Chinese Eastern Railways. There is not a railway in Manchuria recently completed or now under construction which does not derive its *raison d'etre* from motives basically economic, though, it may be admitted, the freight goal at times may be rather more ultimate than immediate and obvious.

Railways and the Trade of Manchuria.—Already Manchuria has more than half as many miles of railway as all the rest of China,* a total of nearly three thousand miles in a territory which thirty years ago had not a rail. Six hundred more miles are now under construction and projects reasonably sure of maturing within the next five years would bring Manchuria's total mileage nearly to five thousand. It is the factor of these railways which, since the beginning of the twentieth century, has made of Manchuria the granary of North China, a producer of fundamental minerals such as coal and iron, of timber, of various raw and staple products, as well as a market for foreign goods, principally railway construction materials, rolling stock and accessories, machinery for manufacture, cotton and woollen goods, hardware, oils and kerosene, electrical goods and sundries.

The annual influx of Chinese workmen, many thousands each year, from over-populated Shantung and Chihli has, within the last two years particularly, taken on new complexion with the fact that a much larger percentage of these hitherto termed "spring come, autumn go" workers are now permanently colonizing the Three Eastern Provinces. Disturbed conditions in Shantung and Chihli, together with comparatively settled conditions in Manchuria—in spite of currency fluctuations—have been contributing factors in this permanent immigration. The construction of new lines in Manchuria, however, is the basic cause for this influx, for one need but refer to the conditions attending the opening of such new lines as the Taonan-Angangchi to see the evidence.

Foreign Trade of Manchuria.—In the reports of the Maritime Customs for the principal "ports" of Manchuria one finds the record of foreign trade, which may be taken as an indicator of the place of the Three Eastern Provinces in the entire trade of China, Dairen, the chief port, now ranks second only to Shanghai in value of import and export trade handled. Although Tientsin ranks ahead of Dairen in point of imports value, that port has been outdistanced not a little by Dairen on account of the latter's export trade, principally to Japan. Dairen, according to the Maritime Customs Reports for 1924 and for 1925, in each of these years exported goods valued two to three times greater than those leaving Tientsin for foreign consumption. And because Japan buys more than any other foreign nation from Manchuria, that nation reaps the benefit of the operation of the well-founded economic principle that whosoever buys most has the advantage in selling. Japan takes 60 per cent. of the total export through South Manchuria; China takes 20 per cent. Of imports Japan supplies 40 per cent, while China supplies 30 per cent. The predominance of Japan in Manchuria's foreign trade is noteworthy as a



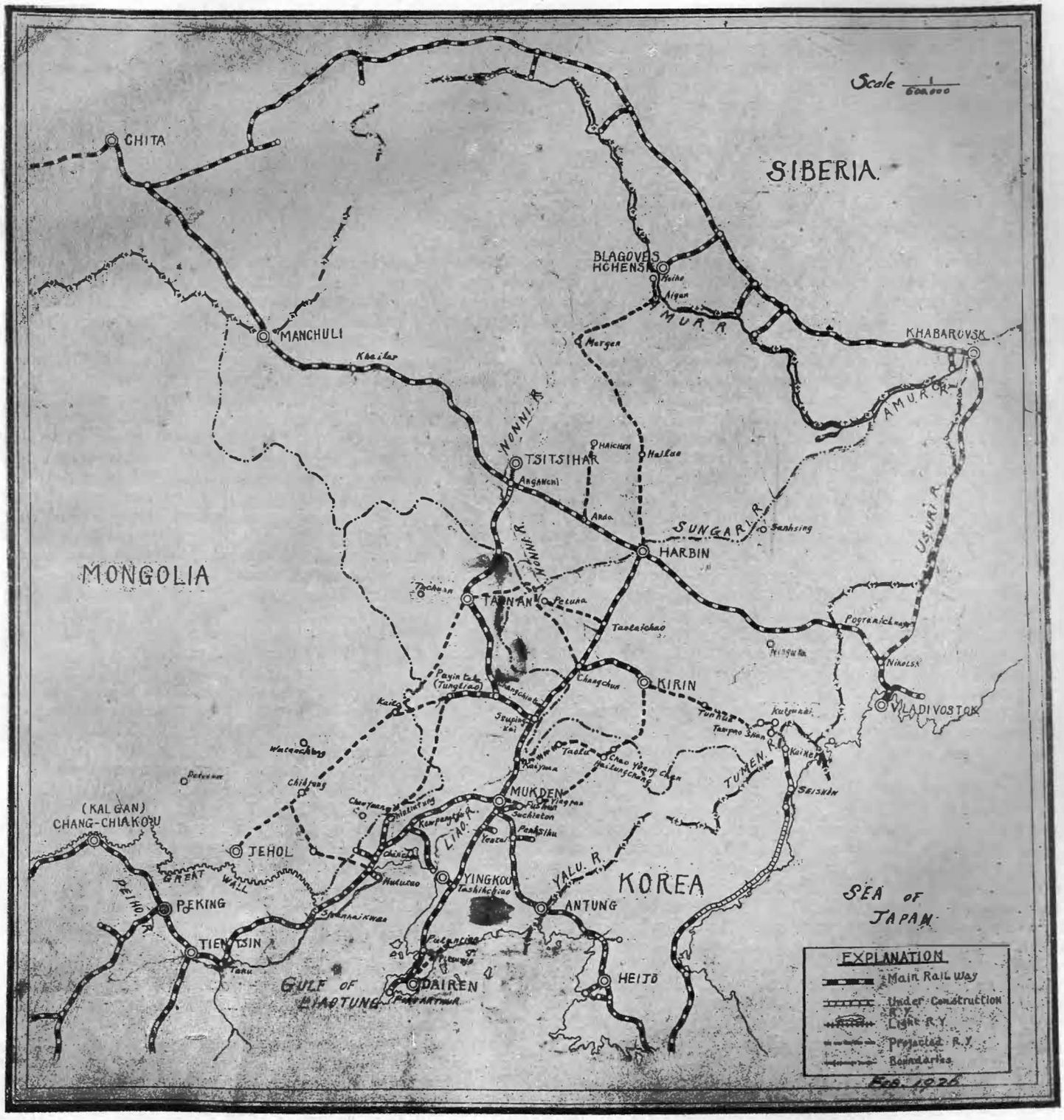
Map showing the Economic Bases of the Manchurian Railway System.

*See Statistical Supplement No. 25 for a list of China's railways and see the Railway Map of China, published by the Bureau of Economic Information

preliminary to the study of that nation's interests in railway construction in Manchuria. Beans, bean cake and bean oil are the principal staples that swell the export to Japan.

Dairen alone supplied 8.87 per cent. of the Maritime Customs revenues in 1925, placing that port third in point of customs income for the Chinese Government, Shanghai being first, and Tientsin, second. The Kwantung Leased Territory itself is a free trade zone. Some idea of the whole trade of Manchuria may be had by reference to the fact that the entire trade value, including native Chinese imports, for 1925, computed from returns of the five principal "ports," Dairen, Newchwang, Antung, Aigun, and Harbin district, was 492,932,488 Haikwan taels. In passing it is informative to note that while Japan purchases exports twice the value of those purchased by her nearest competitor, China, and as much as all the other nations together, including China, that nation is also first among those who supply what Manchuria buys. The United States follows China as a poor third, with the United Kingdom and Hongkong combined in an even more distant fourth. Germany is fifth among the nations who supply goods to Manchuria.

Misconceptions as to Manchurian Resources.—These rather weighty figures are given not to overawe the reader but rather to state facts from which to make comparative judgments as to the wealth of Manchuria. It is as common to over-estimate the riches of the Three Eastern Provinces and their potentialities as to undervalue them. Heilungkiang, Fengtien, and Kirin are, speaking very generally, and compared with the coastal provinces of the rest of China, quite undeveloped from the agricultural point of view. This is still truer of commercial development, for manufacturing is still limited to production of certain staple foods and a few miscellaneous products. To compare the agricultural wealth of Manchuria as a whole with the Mississippi valley in the United States is probably to err on the side of flattery for the former. South Manchuria, generally thought of as of great agricultural



New Railways in Manchuria

value because it is best known abroad, is far inferior in soil fertility to the central regions about Changchun and Kirin and to the northern sections about Harbin and in the valleys of the Sungari and the Amur (Heilungkiang) rivers. Heilungkiang province presents the greatest possibilities for the future in agriculture while Kirin, equally fertile in parts, may be characterized as the zone of greatest development for the near future.

Although the Three Eastern Provinces for years to come will serve to support hundreds of thousands of pioneers from the more densely populated provinces of North China, it should not be assumed that undeveloped areas in Manchuria are limitless. The saturation point, to be sure, is far in the future, which emphasizes the significance of the present program of railway construction in the development of these hitherto virgin regions. Taken as a whole, Manchuria is more densely populated than the United States. This in spite of the fact that Heilungkiang, much the largest Manchurian province, has probably but one-tenth the population per square mile of Fengtien province, and one-fifth the population per square mile of Kirin. The wealth of Manchuria in point of foreign trade quite naturally follows the flow of population, which in turn has more or less concentrated in areas where railways have penetrated. These general truths will serve as an introduction to a study of new railway construction which is today the chief characteristic of Manchurian economics.

Railways Recently Constructed in Manchuria: Japanese Financed Lines

Taonan-Angangchi Railway.—Of the new Manchurian railways the Japanese in particular consider the Taonan-Angangchi extension as of first importance. The line is generally regarded as traversing a region rich in agricultural wealth. This, however, is not strictly true, for much of the land contiguous to the line is alkaline, hardly adapted, therefore, to heavy crop production. The economic motives appear, however, in the fact that it will make possible the diversion of traffic west from the rich Anta district on the Chinese Eastern Railway between Angangchi and Harbin. Anta is the chief assembling center for one of the richest produce areas of Manchuria whose output hitherto has generally been marketed through Vladivostok, due principally to low through freight rates to that port, as against prohibitive through rates *via* the southern branch of the Chinese Eastern from Harbin.

North and west of Tsitsihar are to be found vast virgin forests of the Great Khingan mountains, which in the past have had to depend solely upon the Chinese Eastern for exploitation. It is noteworthy that the Japanese already have in this section the so-called Chaimen timber concession, obtained by purchase a few years ago from the Svetchenko brothers. In considering the economic potentialities of the Taonan-Angangchi line it is important also to include the resources of eastern Inner Mongolia which as yet have found only poor access to world markets. Arrangements have recently been made with the Mongolian princes for settlement by Chinese immigrants of certain lands contiguous to the railway.

The Taonan-Angangchi Railway is a Japanese-financed line constructed under a Sino-Japanese agreement by which the Japanese undertook to supply the capital investment, the rails, the stations and the rolling stock and to construct the line under the supervision of Japanese engineers. Legally the railway is the property of the Chinese. In pursuance of this agreement all construction materials were supplied by the Japanese, rails, some second-hand, and rolling stock having been brought from the South Manchuria Railway. In 1926 Mitsui Bussan Kaisha purchased from the United States Steel Corporation, to be used on the line, rails to the value of Y.457,000. A Japanese official estimate of the total expenditure on account of rails and construction is Y.12,000,000. The outlay for lease of rolling stock is another Y.2,000,000.

The last section of the South Manchuria Railway branch line from Ssupingkai to Taonan was opened to through traffic in November 1923. Upon the completion of this feeder line to the South Manchuria Railway the Japanese instituted plans for financing the construction of a line legally Chinese from Taonan to Angangchi, the latter a station on the main line of the Chinese Eastern from which a light railway proceeds north seventeen miles to Tsitsihar. During 1925 the first section of the Taonan extension was built, and when the ice melted on the Nonni river in the spring of 1926 the frame of a bridge, 2,630 feet long, had been built, and with the use of American track laying machines, which made possible the laying of three and a half-miles a day, the line was extended northward until on July 4, 1926, construction to Angangchi was completed, a distance of 140 miles.

At this juncture plans for continuing the line to Tsitsihar, the capital of Heilungkiang, were impeded by the Russian side of the management of the Chinese Eastern Railway, who opposed the construction of a Japanese-financed line across the Chinese Eastern into the north Manchurian sphere. The Chinese authorities, however, met the objection of the Russians with the declaration that Russia had no legal right to obstruct the construction of any railway on Chinese soil for which there was no treaty stipulation to the contrary. Precedent was cited in the building of the Peking-Mukden line across the tracks of the South Manchuria Railway at Mukden, and, after protracted parleying, a place was found outside the railway zone at Angangchi for the construction of a viaduct by which to cross the Chinese Eastern. The line was formally opened to traffic in the early autumn of 1926. Subsequent floods have interfered somewhat with traffic, but the line is now in complete operation.

International interest has attended the construction of the Taonan-Angangchi Railway because it is the realization in part of the American Straight-Harriman Chinchow to Aigun project which failed partly because of the combined opposition of Japan and Russia. In future, attention will be focused upon the probable extension of this railway to Tsitsihar and to Mergen, there to connect with the extension of the Hulan-Hailun Railway from Harbin, as well as on to Aigun on the Amur (Heilungkiang) river.

Two factors principally have caused the Russians to oppose the construction of the Taonan-Angangchi Railway and lines in northern Manchuria for which Japanese have furnished the capital. First, 60 per cent. of the alien traffic of the South Manchuria Railway at present comes direct from the Chinese Eastern Railway. Second, this alien traffic of the South Manchuria Railway is 40 per cent. of the total traffic carried by that line. Within recent years practically all the goods traffic of the southern branch of the Chinese Eastern between Harbin and Changchun has moved south to Dairen over the South Manchuria Railway. The fact that the construction of the Taonan-Angangchi line may serve to divert a considerable portion of the traffic from Tsitsihar and Anta, which have been the mainstays of the Chinese Eastern carrying trade, has created a serious economic problem for the latter.

Kirin to Korea Railway.—This line now under construction with Japanese capital is commonly termed the Kirin-Tunhua line. In reality it is but the first segment in a railway which is projected from Kirin to connect with a standard gauge line that already runs from Kainei, on the Korean border, to the sea at Seishin in Korea. The Kirin-Kainei Railway, as it is termed by the Japanese, is hardly less significant than the Taonan-Angangchi project, for its future will be a factor of great importance in diverting traffic from the main line of the Chinese Eastern Railway. It will give the Japanese a new approach from the east to Harbin, the principal market of North Manchuria, a route which will be somewhat shorter to Japan than the Dairen route for goods from Harbin. Dairen is 869 nautical miles from Kobe; Rashin, the Korean port which may be substituted for Seishin as the terminus of the Kirin to Korea line, is but 425 nautical miles from Tsuruga, an excellent harbor, now the Japanese port of communication with Vladivostok. The construction of the Ki-Kai line will beyond question seriously menace the future of Vladivostok; how much will be determined by the facilities which the Japanese acquire eventually for diverting freight from Harbin. Much of the produce of Kirin province, which in the past has had to be transported by cart north to Hailin on the Chinese Eastern *via* Ninguta to find an export market at Vladivostok, will be turned south toward Korea, upon the completion of the Kirin to Korea line.

Not only will the haul be shorter from Harbin to Japan, but the region traversed is unquestionably of great economic value. The Kirin to Korea line will open up a territory vastly richer than that through which the Taonan-Angangchi line passes. The Japanese surveyers plan to construct the line through one of the best timber sections of Manchuria near the headwaters of the River Hurka, which, because of its swiftness and the waterfalls in its course, will be used in future to produce hydromotive power.

The mineral resources of Kirin province have never been adequately computed. Some gold and copper are now mined,

the latter in the T'ienpaoshan district contiguous to the Kainei terminus of the proposed line, and adjacent to the Korean border on the Manchurian side. Aluminium, which finds such significant application in aviation, is to be found in the valley of the Hurka, north of Tunhua.

Under the aegis of the Japanese, notably upon land reclaimed by Koreans, rice is being grown north of the Korean border, in fact even in the Siberian littoral much farther north. The Chientao district particularly is an area which produces that staple foodstuff of both Japan and China. Soybeans, wheat and other cereals, which formerly found a market either by cart traffic in the basin of the Hurka to the Chinese Eastern Railway, or to Kirin, whence they were transported west to Changchun and then south to Dairen, will in future find a new market through the Ki-Kai line to northern Korea and Japan. New trade marts with international settlements will likely be opened shortly along this line between Kirin and Tunhua.

Japanese capital is interested in a project for the construction of a feeder line to follow the old route of the cart traffic in the basin of the River Hurka, roughly from Tunhua north *via* Ninguta to Hailin, where there is now a Japanese timber concession, not particularly successful. In this project, which will probably be consummated within the next few years, the principal Russian and Polish private concessionaires, including Messrs. Kovalsky, Skidelsky, and Popoff, who have timber interests between Harbin and Pogranitchnaya are keenly interested. A newly formed Australian syndicate in which the Popoffs are financially interested, registered under the British flag, and which has elaborate plans for the manufacture of various timber products such as paper pulp, turpentine and veneer, look with favor upon the opening of a Hailin to Tunhua line to connect with the new railway that will ultimately extend to Korea. Obstructions and excess harbor charges at Vladivostok make them favor another route for carrying timber products to Japan and the world market.

Originally the construction contract for the Kirin-Korean line was granted by the Chinese Government to three Japanese banks whose interests were later assumed by the South Manchuria Railway Company. The so-called Nishihara loans contained a section which provided for the advance of Y.10,000,000 to the Chinese Government in consideration of the Japanese right to construct a railway from Kirin to the Japan Sea; just where was indefinite. Subsequently, on October 24, 1925, the South Manchuria Railway, represented by Mr. Matsuoka, obtained an agreement with the Ministry of Communications, by which the construction contract was conceded to the former. The line, by the terms of the agreement, is to remain a legally Chinese railway, on the same basis as the Changchun-Kirin line, of which it was to be considered an extension. The contract, though repudiated in 1925, was later re-established by the Chinese Government.

The Kirin to Korea line is now under construction, the roadbed having been completed as far as the Sungari river, where construction of a bridge during January and February, 1927, was facilitated by the placing of several thousand sleepers on the ice over which rails were laid for the moving of work trains. Permanent rails will be laid in the spring. At least three large tunnels are included in the Japanese surveys, which fact has materially increased the Japanese estimate of the total cost. Exclusive of these, however, the South Manchuria Railway estimate of construction cost from Kirin to Tunhua, a distance of 135 miles, has been given as Y.18,000,000. This to be an obligation on the line itself. Probably five years will be required before the entire line from Kirin to the Korean coast is completed.

Chinchow-Pitzuwo Branch Line.—Before passing on to a consideration of Chinese financed lines in Manchuria mention should be made of the Japanese railway from Chinchow, north of Dairen, to Pitzuwo, which crosses the South Manchuria Railway at Shihsanlitai. The entire roadbed has been completed and rails had been laid from Chinchow to Shihsanlitai by the end of February, 1927. This line is a subsidiary of the South Manchuria Railway constructed to develop the Kwantung Leased Territory and particularly to facilitate production of salt in the Pitzuwo district. The Chinchow-Pitzuwo line will probably be opened to traffic in mid-summer.

Chinese Financed Railways

For the past ten years there has been considerable interest shown among Chinese in the proposed construction, independent of either Japanese or other foreign capital, of certain railways in Manchuria, especially in southwest Manchuria. Envisioning the economic advantage of purely Chinese railways in Manchuria, a beginning was made several years ago when the construction of a harbor at Hulutao between Shanhaikwan and Chinchow was started. Because of internal disturbances in China, however, what has been done at Hulutao has largely gone to ruin. This port if completed in the future would serve to make the Peking-Mukden Railway and the other purely Chinese lines which might connect with it, entirely independent of traffic from the South Manchuria Railway, and not dependent upon the port of Dairen. The Japanese are keenly aware of this eventuality and it is only in the more conservative Japanese groups that the opinion is expressed that the port of Hulutao, or Lienshan as the station on the main line is called, will not be able to injure seriously the port of Dairen. Hulutao still remains undeveloped. Several new railways, however, in the region roughly between Mukden and Lienshan have been projected by Chinese enterprise, two of which have been completed in part during the last two years.

Tahushan-Changwu-Chengchiatun Railway.—This is a line which, as originally projected, was to proceed north and west from Tahushan, a small station on the Peking-Mukden line, to Changwu, where it was to serve as an outlet for the produce from Inner Mongolia. Changwu is almost due south of Tungliao, often termed Paiyintalai, which latter is the western terminus of the Chengchiatun-Tungliao line. Instead of proceeding to Tungliao, however, the new line now projected will continue northeast to Chengchiatun which will made possible through connections between Tientsin, Taonanfu, Tsitsihar, and north, if the Taonan-Angangchi line is extended. This would obviate any use of the South Manchuria Railway for this through traffic as the Ssupingkai to Mukden section would be eliminated. The first section of this new line from Tahushan to Hsinlitun was completed by August, 1925.

Some idea of the importance of this new line may be gained by recalling that it is, in a measure, a partial realization of the Chinchow to Aigun railway scheme contemplated in the past both by British and American capitalists. Immediately, the line will be serviceable to market the produce of Inner Mongolia and southwest Manchuria, but ultimately, when completed, it is bound to open a new avenue to draw North Manchurian produce to China proper by way of Tientsin. Inner Mongolia, not far from the new line, is a potential producer of great quantities of natural soda, while coal is to be found near the railway. Another Chinese line north from Chinchow on the Peking-Mukden Railway to Chengtzutung, a distance of 60 miles, is now under construction.

Kaiyuan-Taolu-Hailungcheng Railway.—This is at present a metre gauge line which proceeds from Kaiyuan, north of Mukden on the South Manchuria Railway, east to Taolu, a distance of 40 miles. Whether extension to Hailungcheng is contemplated for the near future will depend upon the Chinese decision as to the continuation of the Mukden-Hailungcheng Railway to Kirin. The Kaiyuan-Taolu line is a purely Chinese enterprise which is not capable as yet of handling very heavy traffic. For the present, not this line, but the Feng-Hai Railway, is of real importance in developing Kirin province.

Mukden-Hailungcheng-Kirin Railway.—This line is probably the most important of the several lines in central Manchuria now being constructed independently by Chinese. The agricultural and forest wealth of Fengtien and Kirin provinces, previously referred to, are to be relied on ultimately to finance the line, which is a sort of official-private project. A privately owned coal mine in the vicinity of the huge Japanese mines at Fushun was the inspiration for the building of the first short section of the line, which was continued to Yingpan, a distance of 40 miles. In February, 1927, the new railway was opened to traffic to a point near North Shanchengtzu. Through traffic to Hailungcheng may be expected by summer.

The Japanese have not looked with favor upon the independent construction of this line by Chinese, nor particularly upon the purchase from the United States Steel Corporation of rails for the line. In January, 1927, Consul-General Yoshida of Mukden protested for the Japanese against the Chinese plan to continue the Feng-Hai line to Kirin, on the ground that such extension would make the Chinese line parallel with the South Manchuria Railway, and as such would be contrary to the Sino-Japanese agreement of September 28, 1918, commonly referred to as the "Four Manchurian Railways Loan Agreement."

Hulan-Hailun Railway.—Considerable interest has attended the construction, during 1925 and 1926, of the so-called Hu-Hai line, which has served to open to territory that is probably the most productive wheat region of Manchuria. The line, which is financed by General Wu Chun-sheng, through the Tsitsihar Provincial Bank, is a purely Chinese project, and is being built by Russian engineers under the general supervision of Mr. Boris V. Ostroumoff, one time manager of the Chinese Eastern Railway. Rails were purchased in May, 1926, through Suzuki and Company, a Japanese firm, from the United States Steel Corporation to the value of Y.621,000. The new line was opened to through traffic from Hulan to Suihua, about 70 miles, on January 22, 1927. Sungpu, near Harbin, will likely be made the seat of administration of the Hu-Hai line. Immediate extension of the line beyond Hailun may be impeded somewhat by recent difficulties in connection with financing the project.

The Hulan river valley is recognized as a most fertile grain region which, along with the Anta district, has been the mainstay of the produce traffic of the Chinese Eastern Railway. The area immediately to be served by the Hu-Hai line, which runs north from Hulan, a short distance from Harbin, at present is estimated to have a population of 3,000,000, showing that it is by no means as sparsely settled as was commonly thought. Much of the region is now under cultivation and that which lies contiguous will be developed rapidly after the opening of through traffic to Harbin. Formerly the produce from this grain belt found its slow way to market by means of carts, which type of traffic will not be taken over in view of the fact that the new line is standard gauge and the Chinese Eastern at Harbin is broad Russian gauge. Consequently, because of the difficulty of transfer from the new line to the main line of the Chinese Eastern, it is to be anticipated that much of the produce from the Hulan valley will still be carted to Harbin or other points on the Chinese Eastern.

Difficulties have already developed between the management of the Hu-Hai line and that of the Chinese Eastern Railway regarding the issue as to whether Sungpu shall be handed over to the Chinese Eastern Railway management, a demand which has so far not been met, and the connections between the southern terminus of the Hu-Hai line and Harbin *via* a short line of the Chinese Eastern remain broken. The Russians would have preferred the Hu-Hai line to be of the Broad Russian gauge instead of the standard, which is the Japanese. A coal mine has recently been reported near the Hulan-Hailun line.

Aside from the boon which the Hu-Hai line will be to this superior grain belt of North Manchuria, there is the even more significant factor of the likelihood of the eventual extension of the line from Hailun to Mergen, there to connect with a continuation of the Taonan-Angangchi-Tsitsihar line to Mergen. A northeast extension from Mergen to Aigun and Heiho on the Amur river (Heilungkiang) would be a logical and entirely practicable development from the coverging of the Hulan-Mergen and the Taonan-Tsitsihar-Mergen projects, and would effectuate one more link in that long chain of railways contemplated at various times by British, Russian and American financiers. In a Chinese agreement with the Russo-Asiatic Bank in 1916, this entire system for railways in North Manchuria was included by M. Grave, who negotiated the agreement. In passing, it should be noted that this latter agreement is considered by the Chinese, who have financed the Hu-Hai line, to have lapsed.

That the extensions suggested are to be developments of the future is undoubted. The prospect of through traffic from the mouth of the Amur river, navigable by sizable steamers far inland, through the provinces of Heilungkiang and Fengtien provinces, to the Gulf of Pechili by railway, is so replete with economic possibilities as to be certain of eventual realization. Heilungkiang province, besides being of great value as an agricultural region, is rich in gold and coal beds which lie adjacent to the Amur.

Russian and Polish Private Concession Lines

No survey of the economic bases of new railway construction in Manchuria, however brief, would be adequate which did not give at least brief attention to the numerous short railways which serve private timber and coal concessions between Harbin and Pogranitchnaya along the line of the Chinese Eastern. These are of great economic importance to the main line. With the exception of one branch of the Chinese Eastern Railway from Shihtaohotzu, about 30 versts, near the Pogranitchnaya border, all these are privately owned and constructed to serve private concessions. Among these there are three principal groups, those owned respectively, in whole or in part, by Mr. Kovalsky, Mr. Skidelsky and the Popoffs.

Mr. Kovalsky, a pioneer Polish timber concessionaire whose headquarters are in Harbin, has six short lines, the longest from Imienpo north to his concession, a distance of 70 versts. A second, 30 versts in length, also to the same concession, a third short line from Hantaohotzu north and east, and the others north from Mulin, farther east, serve important timber concessions. Of Mr. Kovalsky's lines 94 versts are the broad Russian gauge, 25 versts narrow gauge, and 8 versts less important cable lines. These are all privately owned.

Mr. Skidelsky's important railway, 60 versts in length, which proceeds north from Mulin towards Mishan, and which is owned in part by private Chinese financiers, at present serves several timber concessions by means of branch spurs. Plans have been made, however, for the immediate extension of the line farther northeast to tap the coal mines which exist near Lake Hanka, the source of a tributary of the Amur river. Adjoining the Kovalsky timber concession at Mulin is that of the Popoffs, who also have a private line. It is here that the newly formed Australian syndicate proposes to establish factories for the manufacture of timber products previously referred to. The Japanese timber concession at Hailin has received attention elsewhere in connection with discussion of the branch Hailin-Ninguta-Tunhua Railway to connect with the Kirin-Tunhua line.

Chinese Eastern Branch Line Projects.—The construction of several proposed branch lines to the Chinese Eastern Railway has so far failed of realization, due to the present reorganization of administration of that system. From time to time, however, proposals have been proffered for the construction of the following lines: (1) a Russian broad gauge to take the place of the narrow gauge which now connects Tsitsihar with Angangchi, a distance of 17 miles; (2) a broad gauge line from Anta station to Paichuan, possibly to connect with Hailun; (3) a new broad gauge and extension from Hailin and Ninguta south into the valley of the Hurka: (4) other lines branching north and south from the main line of the Chinese Eastern between Harbin and Pogranitchnaya. There is very little likelihood of any of these being constructed in the near future.

The prosperity of the Three Eastern Provinces since the inception of the Chinese Republic in 1912, during which entire period Marshal Chang Tso-lin has been in control, has rested chiefly upon foreign trade, which has furnished a market for Manchurian produce. But without the network of railways, which now span a rather frail spider-web of communication lines strung from trade vantage points on rivers and seas, soybeans would still be lumbered to market in cumbrous carts, oil would be extracted entirely by hand presses, production in vastareas would be for local consumption, and the standard of living of the Chinese farmer would not differ radically from that of his brothers across the Gulf of Pechili.

Manchuria, which comprises a territory of perhaps 365,000 square miles, only a small fraction of which is under cultivation, which has a population of probably not more than twenty millions, remains one of the richest sections of China, dependent upon railways for future economic development. If the United States, Japan or Germany, instead of the rest of China, were taken as a standard with which to compare Manchuria, adequate reasons would at once appear why new railways were needed on grounds of transportation economics, and that in spite of the obvious fact that Manchuria is China, that Manchurian industry is still quite undeveloped, and that, as such, it cannot support as yet the intricate system of railways which covers the United States.

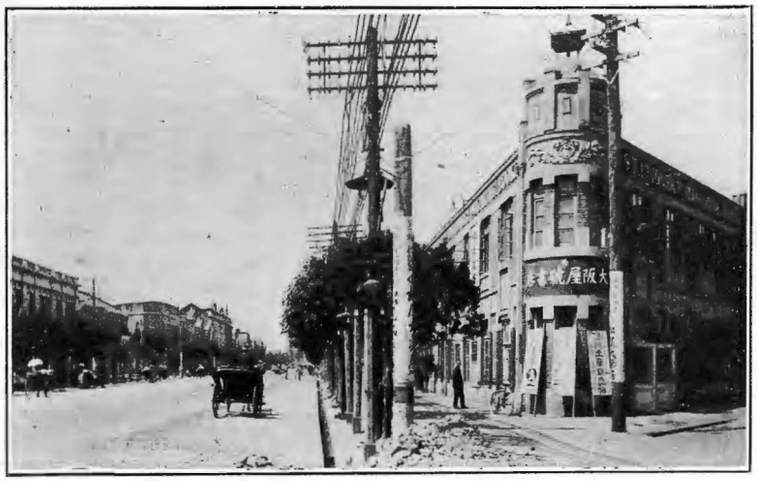
Manchurian economics has, however, begun the slow transformation from extensive to intensive agriculture, from hand to machine manufacture, and from cart to car transportation, a process which bids fair to preserve for the territory that international reputation which was obtained for Manchuria when two modern wars were fought on its plains. The quantity existence of coal at Fushun and of workable iron mines at Anshan quite naturally suggests the Ruhr. Those who would seek insight into the industrial future of Manchuria well might recall what Pennsylvania coal and Minnesota iron have meant to the United States, and then remember that in Manchuria these essentials of modern industry are found almost side by side.

The South Manchuria Railway

Dr. Henry W. Kinney, who for many years has been one of the most prominent journalists in the Far East, has just published an interesting booklet on "Manchuria and the South Manchuria Railway Company." For those interested in China and Manchuria and the international problems arising out of Manchuria, will find Mr. Kinney's book invaluable. It provides a ready reference to the exact facts with regard to this vast and interesting territory and to the railway which forms its backbone.

We are herewith reprinting several pages from Mr. Kinney's booklet:

To the world at large Manchuria represents a vast area capable of furnishing it with immense quantities of agricultural, forest, mining and other products. In its relation to the world Manchuria is a new country. Thirty years ago it had only one, relatively unimportant, Open Port, Newchwang, through which its foreign trade was conducted. Since then this country has been opened, first by Russian activities; then by Japanese development. Railways have been constructed which make possible utilization of enormous tracts of heretofore unproductive lands of marvellous fertility. During the last twenty years the population has increased from 12,000,000 to 22,000,000. Modern industries have been established on a large scale where a few decades ago only the most primitive production methods were employed in a very limited way. And still the resources of Manchuria have not yet been even half developed. The march of progress continues apace. New railways cause the settlement of new regions. New industries spring up. Production increases, and the number of people who are able to derive a livelihood and prosperity from Manchuria becomes greater with each passing year.



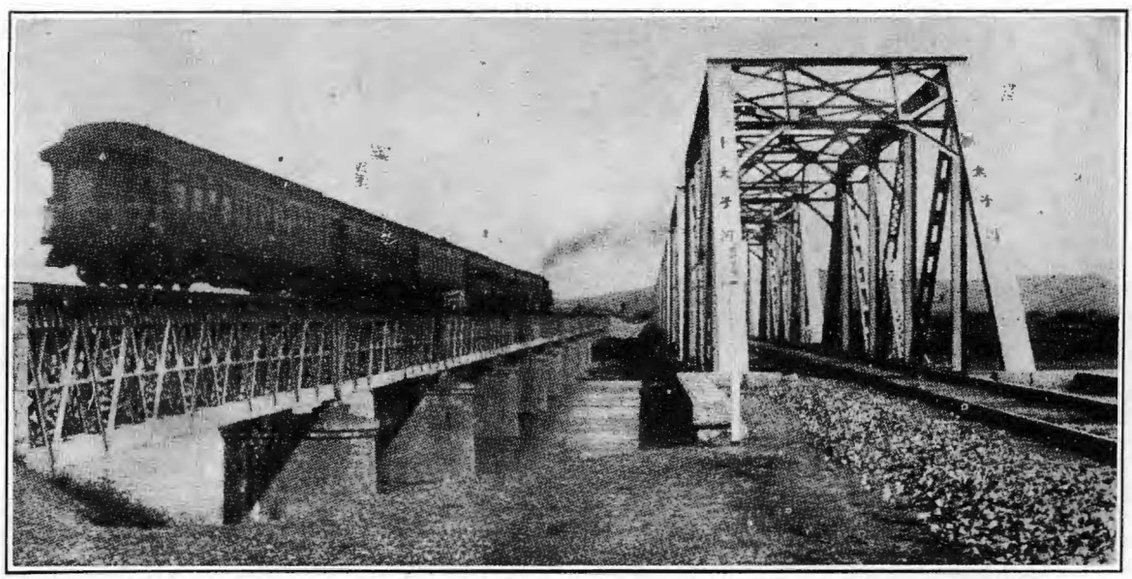
The View of Maniwadori, Mukden

The greater share of the credit for this contribution to civilization may be claimed by Japan, which, after the Treaty of Portsmouth, in 1905, took over the only partially developed and principally military Russian enterprises in Manchuria and embarked on the policy of economicdevelopment which has made Manchuria the most prosperous and peaceful region in China. In this work the South Manchuria Railway Company has been the principal factor.

Not Conquest, But Development

The activities and aims of the Japanese in Manchuria have from time to time been the object of suspicion and misapprehension abroad. Still, the reasons for Japan's interest and her ambitions in Manchuria are easily understandable. There is no question of conquest, nor even of colonization on a large scale. From the very beginning Japan decided to work out her future by means of industry and commerce—not by war. She must make the money which she needs to pay for the foodstuffs which she must import to feed her rapidly increasing population. She will do this by developing her industry and commerce. In these days of strenuous world competition, she must seek the markets where she may enjoy the greatest natural advantages. These lie principally in eastern Asia, and Manchuria furnishes one logical field. Thought of conquest is out of the question for many reasons: It would be contrary to Japan's established policy of peaceful co-operation with the other Powers, of which she gave a significant demonstration at the Washington Conference; it would cause a hatred of Japan on the part of all the rest of China which must result in the loss of her most important and promising market—so the game would not be worth the candle; finally, it has been conclusively demonstrated that Japanese employed in a small way as farmers, small merchants and the like cannot compete with the Chinese, whose standard of living is much lower and whose energy, patience, and thrift are inexhaustible.

So Japan must seek to gain from Manchuria by assisting the Chinese to develop the country and by showing them the way. This she has done and is doing by building railways, by showing them better farming methods and by finding new markets and processes by which the utility and value of the products are increased. As a result Manchuria is becoming in rapidly increasing degree a vast storehouse of the raw materials which Japan needs for her industries at home. It is also becoming a greater market in which Japan can sell her manufactured goods, as the buying power of Manchuria increases with the increase of population and with the prosperity of the inhabitants.



At Left Bridge Built by the Russians and Repaired by the Japanese. At Right Bridge Built by the Japanese

A Civilizing Force

To some extent Japan has profited directly from her activites in Manchuria, through profits from railways, mines, and industry and commerce, but, on the whole, the results have as yet been far from commensurate with the money and effort expended, and this is largely due to the fact

that Japan's principal instrument, the South Manchuria Railway Company, regards itself as a civilizing force rather than as a mere commercial enterprise for profit, and devotes huge portions of its earnings to cultural and eleemosynary work, by building and maintaining numerous modern schools, hospitals and the like which can yield neither direct nor indirect financial returns. The value of this is, however, greater than that which it intrinsically represents, for it serves a valuable purpose by instructing the Chinese in the arts and means of modern civilization. An example is being provided which the Chinese are showing greater and greater inclination to follow, as is shown by the tremendous improvements of their own towns made through their own efforts. If the freedom from war which Manchuria has enjoyed, almost without interruption, for over twenty years, continue, it is certain that this region, which was until recent years considered by the inhabitants of China Proper as a wild and barbarous country, will become to them on a magnificent scale a demonstration of what may be done in the rest of China, an example which it will be well to follow.

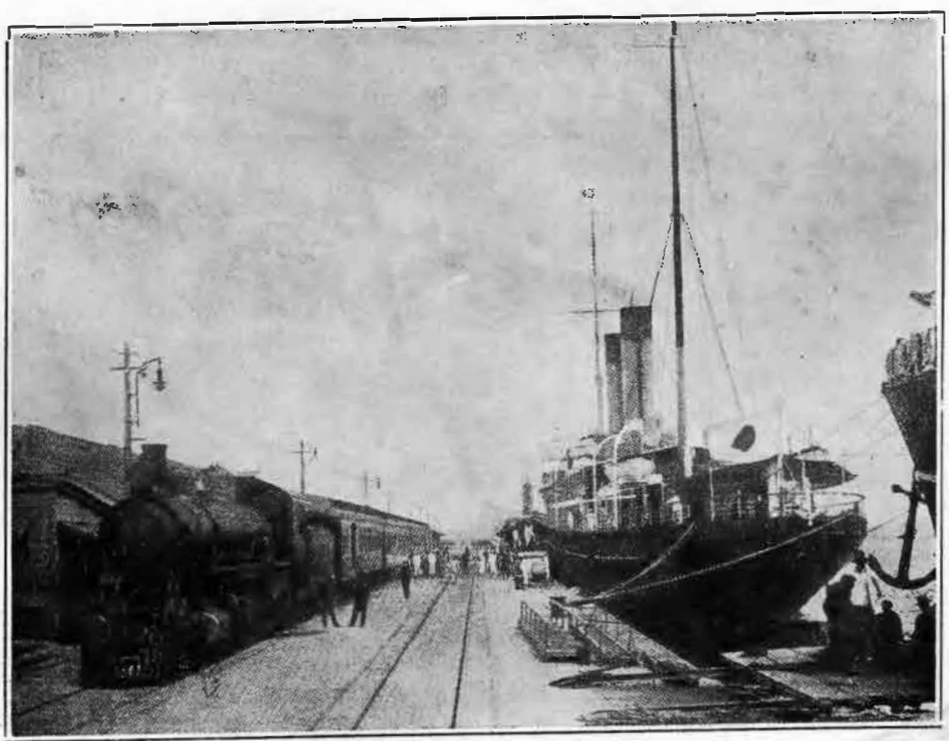
Political Position

Thus the aims of Japan in Manchuria are preponderatingly economic; yet the strategic considerations cannot be overlooked. Japan is well aware of the fact that if dangers shall ever threaten her, such are most likely to develop on the continent of Asia. For centuries the Japanese have known that potentiality of peril exists in the geographical position of Korea, "the dagger pointed at Japan's heart," and the strategic necessity of keeping that peninsula free from danger of hostile occupation is indisputable. It is thus to the interest of Japan, both for economic and military reasons, that Manchuria remain peaceful and undisturbed in Chinese hands. Whose these hands be is relatively unimportant, as long as they be strong enough to maintain peace and order. The misconception current abroad that Marshal Chang Tso-lin is a virtual puppet of Japan cannot but be amusing, and a little galling, both to the War Lord of Mukden and to the Japanese. The assistance which he gave Japan as a leader of an irregular cavalry force during the Russo-Japanese war has been appreciated, as has also the fact that he has been strong enough to keep war from invading the Three Eastern Provinces and has thus made it possible for industry to develop in a way which has been impossible in the greater part of war-torn China Proper. But the Manchurian government has given Japan nothing for which it has not been generously, often over-generously, paid. A healthy and laudable nationalistic spirit has been developed which prompts the leaders in Manchuria to wish to undertake the work of development themselves, where they are able to do so. In fact, far from "taking orders" from Japan, the Manchurian government often stands in the way of the realization of Japan's ambitions, as, for instance, by refusing to allow Japanese to lease land, although this right has been assured by treaty. It is the policy of the Japanese Government, however, to remain on terms of friendly co-operation with those who rule Manchuria, and to assist them, as far as this may be done without encroaching on the principle of non-interference with internal affairs of China. A strong, forward-looking government of Manchuria is to the best interests of Japan. The portion of Manchuria which Japan actually controls—the Leased Territory, with about 1,300 square miles; and the Railway Zone, of about 100 square miles—is infinitesimal when compared with the total of about 382,000 square miles which comprise the Three Eastern Provinces. Japan's military force in Manchuria is small, some 7,500 men, though by treaty she has the right to station double that number there. In view of the widespread operations of bandits, often in large bands which attack even small towns, this force is by no means overlarge. Japan at first had a naval station at Port Arthur but she now maintains no naval establishment there.

The development of Manchuria's resources, accompanied by an increase in its population, which will become prosperous through wresting rich products from a hitherto largely idle soil, is the aim of Japan in Manchuria. This will give her raw materials for her factories, and the great hordes of immigrants from Shantung and Chihli who settle as pioneers in Manchuria every year, then rising from empoverished coolies to prosperous farmers, are creating an increase in the world's buying population from which not only Japan, but all commercial nations will benefit. An auspicious beginning has already been made. Merchants of many nations are already operating and profiting from the great work of civilization which is being carried on and for which Japan, and her principal instrument, the South Manchuria Railway Company, may justly claim the greater measure of credit.

On September 5, 1905, Japan entered into possession of the rights and properties formerly held by Russia in Manchuria. Besides the lease of territory, these consisted mainly of the railway between Port Arthur and Changchun, with comparatively light rails, poor grades, and no rolling stock; the town of Port Arthur, which had been badly damaged in the siege; a mere nucleus of the City of Dairen and a less than half-constructed and rather shallow harbor; and four very small railway towns along the line. From this modest beginning she built up the efficient and modern railway system, the large and flourishing railway towns, with their hospitals schools and hotels; and made Dairen the second port in China in point of volume of direct foreign trade.

On June 7, 1906, the South Manchuria Railway Company was established through Imperial Ordinance, to manage the railway and the railway area, as well as the many allied enterprises which gradually became attached thereto. It was capitalized originally at 200 million yen, of which the Japanese Government took over half of the capital stock as payment for the property which it turned over to the Company. The rest was offered for public subscription. It was not regarded as a good investment by the public which had seen the Russian Government pour into this enterprise million after million without profit, and the Chinese, to whom Japan offered the privilege of taking over any part of the stock offered for public subscription, declined the offer flatly. It was, however, regarded by the Japanese, whose patriotism had been thoroughly aroused during the war, as a patriotic enterprise. The shares were over-subscribed 1,066 times, and to-day only Japanese own such, and they have enjoyed the agreeable surprise of receiving good returns on their investment. In 1920, the Company increased its capitalization to 440 million yen, the Government again taking half by taking over two bond issues, of 6,000,000 pounds sterling each, floated in the London market. Of the remaining shares 160 million yen have been subscribed by the public, and the remaining sixty million yen remain unissued.



Train and Steamer Connection at the South Manchuria Railway Wharves, Dairen

The Government General of Kwantung was established September 1, 1906, and in April, 1919, the

Kwantung Government Office was made to take over the civil administration and policing of the Leased Territory and the Railway Area. The Governor is also charged with supervision of the South Manchuria Railway Company. The officers of the latter are a President and a Vice-President, both appointed by the Japanese Government with Imperial sanction, and a Board of Directors appointed by the Government from among the shareholders. The company employed (March, 1926) 9,674 officials, 28,847 employees, and 127 persons not on the regular staff, totaling 38,648, of whom 16,326 were Chinese. In addition to these, about 13,000 day laborers were employed, nearly all of whom were Chinese.

The railway system which the South Manchuria Railway Company took over, in 1906, was in a sorry state. All the rolling stock had been withdrawn by the Russians or destroyed and most of the bridges had been blown up during the Russian retreat. The main line consisted of a single track from Port Arthur to Changchun, and many of the grades were quite steep. At the beginning the track was changed from the five foot Russian gauge to the narrow gauge used by the railways of Japan, in order that rolling stock brought from Japan might be employed, but soon the entire system was changed to the standard (4'8½") gauge used by the Government Railways of China, and rolling stock was imported. (It is interesting to note that while the S.M.R. floated its loans in England, the bulk of its purchases of equipment was made in the United States, the percentage of direct imports from that country being 67 per cent in the 1907-8 period and averaging 31 per cent during the period 1907-20.) The Russian 65 pound rails were replaced with 80 and, later, with 100 pound rails and the main line double-tracked as far as Kaiyuan. It will soon be double-tracked all the way to Changchun. The grades have been leveled and the roadbed improved. As a result the S.M.R. has provided the best equipped railway system in eastern Asia. It has followed entirely American models and the entire service is similar to that which is found on the best roads in the United States.

The line between Antung and Mukden was originally built as a light military railway by the Japanese troops during the course of the war. Through treaty with China, the S.M.R. was allowed to rebuild this line, which was done by relocating it in many places, building tunnels and reducing grades, effecting a saving of over 18 miles.

The lines owned and operated by the S.M.R. are as follows:

1.	Dairen-Changchun (main line)	438.5 miles
2.	Mukden-Antung (Suchiatun-Antung ...	161.7
3.	Port Arthur-Dairen (Port Arthur-Chou-shuitzu branch)	31.6
4.	Yingkou (Newchwang) branch (Tashih-chiao-Yingkou)	13.9
5.	Yentai colliery branch	9.7
6.	Hunho-Fushun lines	39.4
	Total	694.8 miles

Chinese Railway Lines

It should be noted that while Japan has greatly improved, by double-tracking, leveling etc., its own lines, it has during the twenty years of its operations extended the territory covered by its lines by only a few miles. It has, however, assisted the Chinese by building railways for them, partly by furnishing loans and partly by doing the actual construction work, which have greatly extended the area reached by railways and have thus contributed to opening of heretofore uncultivated territory. All of these lines (with the exception of the Kirin-Changchun line, which is managed by the S.M.R. under a special contract) are owned and operated by Chinese, with the Japanese interests represented on each line only by two or three officials whose duties are entirely supervisory, without power of initiative, the management being under the Department of Communications at Peking. The assistance thus given by the S.M.R. has not been remunerative from a strictly financial point of view, as most of the contracts have been less advantageous than those held by other foreign railway builders in other parts of China, but they have been justified in that they act as feeders to the main line of the S.M.R. These lines are as follows:

Ssupingkai-Taonan (with Paiantala branch)	264.5 miles
Taonan-Tsitsihar (Anganchi)	141.7 ,,
Kirin-Changchun	79.3 ,,

During recent years the Chinese have awakened to the importance of railways and the possibility of profits in constructing such themselves, and they have built and are building several new lines. Among these the most important are the eastward extension of the line from Kirin to Tunhua, which is being built for them by the S.M.R.; a line from Hulan, a point of the Sungari River, opposite Harbin, northwards to Hailun, which may in time be carried on to the Amur River; and a line from Mukden in a north-easterly direction to Hailungchen. The two latter are being built by the Chinese themselves. Other railway lines are being more or less definitely planned.

Link in World Travel

The S.M.R. lines are of predominating importance, not only as they furnish the main line traversing the rich central plains of Manchuria and thus give transportation for exports and imports of the entire region, but also because they constitute an essential link in the rail connection between East Asia and Europe, which is becoming increasingly important and popular with travelers as arrangements progress between the various railway systems concerned which improve the through service materially. Thus travelers between Europe and Japan travel over the S.M.R. lines between Antung and Changchun, while those from Shanghai and other points south travel over the line between Dairen and Changchun, where connection is made with the Chinese Eastern Railway. Travel from Peking, Tientsin and other points in North and Central China connects with S.M.R. lines at Mukden for transportation to Changchun.

An idea of the saving in time which may be effected by traveling by rail, as compared with the time consumed in traveling by sea, may be had from the following:

Tokyo to London:

By rail 16 days, fare Y600; by steamer 50 days, fare Y1,100

Shanghai to London:

By rail 16 days, fare Y600; by steamer 41 days, fare Y1,050

Growth of Traffic

While the railway under the Russian regime was conducted mainly for military purposes, its function to-day is entirely economic. As Manchuria has developed, increasing in population and productivity and opening rapidly to foreign trade, the train service has increased in proportion. Fast expresses, with luxurious observation and dining cars, and Pullman sleeping cars, carry the principal first and second class passenger traffic, while numerous second and third class trains, with diners and sleeping cars, handle the slower traffic, especially the many thousands of Chinese who immigrate into Manchuria every year. As the traffic has increased, better equipment has been provided and schedules gradually shortened until to-day when the express makes the 436 mile run from Dairen to Changchun in 12½ hours. The increase attained in business may be seen from the following figures (amounts given in yen):

	Passengers	Passenger Receipts	Tonnage of Goods	Goods Receipts	Total Receipts	Direct Expenditures
1907 ...	1,512,231	3,594,239	1,486,434	6,160,274	9,768,887	6,101,615
1926 ...	8,445,271	14,956,172	16,253,250	89,080,157	106,491,136	35,830,004

(The total includes, also, miscellaneous receipts)

The principal goods transported are soya beans, bean cake, and other staple products, and the Company's Fushun coal. The fact that the export traffic is far greater than the import traffic constitutes a drawback. The profit derived from passenger transportation comes almost entirely from the third class traffic, the expresses being operated at a loss.

It will have been seen that, outside of the main part of the original roadbed, practically the entire equipment of the S.M.R. has been provided by the Company itself. In the beginning it was necessary to import from abroad nearly all the material needed, but the Company is now able to construct a large part of its equipment in its own shops. From Russia Japan inherited only two small repair shops, but to-day the S.M.R. possesses two large plants, one at Shakakou and the other at Liaoyang. The former covers an area of 9,972,000 square feet of which 504,000 feet are covered by offices and shops. Here locomotives, cars and all other principal equipment needed by the railway, except rails, and be constructed. The shops are capable of repairing simultaneously 27 locomotives, 36 passenger cars and 130 freight cars, while at the same time constructing and repairing other railway equipment, mining machinery etc. An electrical repair shop has been established at Dairen.

The railway equipment to-day comprises 425 locomotives, 430 passenger cars, 6,642 freight cars and cabooses etc. The stations total 128.

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THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

上海仁記路拾六號

SHANGHAI'S NEW BILLION DOLLAR SKYLINE

JAPAN'S PROBLEM IN CHINA

IT PAYS TO ADVERTISE

THE ANTI-JAPANESE BOYCOTT MOVEMENT

DR. HU SHIH'S MOTOR CAR CIVILIZATION

TELEVISION AND RADIOVISION

Vol. XXIII | June, 1927 | No. 6

A Hospital Launch for Malay*

British-engined 52-ft. Boat Fitted with Twin-screw Machinery

THE advantages of a mobile hospital and dispensary in many districts overseas have frequently been emphasised, and craft of this type are virtually a necessity where wide areas of marshland make the available waterways the only certain means of communication between various towns and villages.

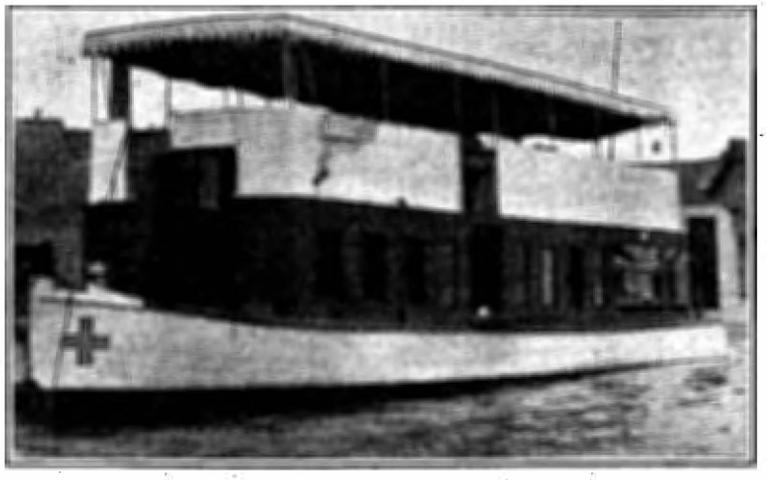
It is for reasons of this character that, some months ago, the Perak Government instructed Messrs. J. I. Thornycroft to build a combined ambulance and dispensary launch, in collaboration with the principal medical officer of the F.M.S. Government, the boat being called upon to comply with the conditions peculiar to the up-country rivers in the Perak State.

One of the principal considerations is shallow draught—an essential feature if certain of the minor streams is to be successfully navigated. In this connection the maximum that could be allowed is only 15 ins. The builders have had considerable experience with the design of shallow-draught boats, particularly in regard to tunnel-stern construction, a system which is embodied in the craft in question and in which the tunnel is arranged to house twin propellers.

A Singapore Production

The actual work of construction was carried out by Thornycrofts (Singapore), whose premises are known, incidentally, as the Tanjong Rhu Shipyards, Malay. The work of the boat will be to visit up-country villages, which would be virtually isolated were it not for water transport, and it is anticipated that the craft will be a considerable asset to the administration of local medical service.

The photographs which we reproduce were taken prior to the completion of the vessel. The interior accommodation provides not only for the comfort of patients, but, in addition, living quarters for the medical officers and staff who are appointed to the launch. The sick-bay is provided with an operating table, dispensing table and cabinet, sink, poison cupboard, shelves and other more minor items of equipment.



A 72 h.p. Motor Boat for Medical Service. A Repeat Order was Placed upon the Completion of the Trials

Unusual Arrangements

Portable lifting gangways are fitted adjacent to the sickbay, and these can be lowered at villages *en route* and so enable the patients to enter the sick-bay from the river bank or stand on the gangways and receive inoculation, as may be desired. To ensure the utmost cleanliness all tables, cupboards and certain other furniture are faced with plate-glass, whilst mosquito-proof screens are fitted to all windows and doors.

The boat will be based at Teluk Anson and operate from this point along the Perak River. Two medical officers will be carried permanently, together with dispensers and dressers, whilst full facilities are provided for operations to be carried out aboard the boat if necessary. The furnishing and equipment generally are of such a nature as to ensure both efficiency and comfort for all concerned. A roomy upper deck with permanent sun awnings occupies practically the whole length of the boat.

The dimensions of the boat are 52-ft. overall, with a beam of 12-ft. The power plant consists of a pair of four-cylinder 36 h.p. Thornycroft motors, each fitted with reducing and reversing gears. With this power the boat is able to attain a speed of 10¼ m.p.h. Upon completion the craft recently proceeded to Teluk Anson from Singapore under her own power, the distance being 320 miles, and this was covered in just under 36 hours, no stops being made, for the cruising radius is considerable.

On arrival at her destination trials were carried out, at which the Sultan of Perak, together with Government officials, were present. That the boat proved completely satisfactory may be judged from the fact that a repeat order was immediately placed by the Pahang Government for an exactly similar boat. A valuable feature of the craft is the ease with which she may be manœuvred when under way, the vessel answering the helm with the utmost facility. This is important, as it is not unusual for tunnel-stern craft to be somewhat difficult to handle.

*The Motor Boat

Economic Conditions Along Taonan-Angangki Railway

The Taonan-Angangki Railway traverses a large tract of fertile land rich in agricultural products. Taonan, a gateway leading to Eastern Mongolia, is growing in importance commercially, with annual exports worth about $5,000,000 and imports from $3,000,000 to $5,000,000. Goods shipped from Taonan station along Taonan-Ssupingkai Railway in 1925 amounted to 94,599 tons, while the in-coming freight came to 99,581 tons, as compared with 64,000 tons and 15,000 tons respectively in 1924. About 90 per cent. of the goods consisted of cereals. Of these goods, 68 per cent. were shipped by Chinese merchants and 32 per cent. by Japanese; 45 per cent. being destined to Dairen, 30 per cent. to Ssupingkai, 15 per cent. to Antung and 5 per cent. to Newchwang.

The Taonan-Angangki Railway transports produce from eight districts along the line, namely, Taonan, Ankwang, Lichuan, Tsingan Chentung, Talai, Tailaichi, and Kingsingchen. The following table shows the area of cultivated land and production of cereals in these districts in 1926:

District	Area of Cultivated Land	Yield of Cereals
Taonan ..	.. about 800,000 *mow*	250,000 piculs
Ankwang	.. ,, 650,000 ,,	130,000 ,,
Lichuan	.. over 400,000 ,,	120,000 ,,
Tsingan	.. about 900,000 ,,	280,000 ,,
Chentung	.. ,, 400,000 ,,	120,000 ,,
Talai ..	.. ,, 550,000 ,,	680,000 ,,
Tailaichi	.. ,, 140,000 ,,	80,000 ,,
Kingsingchen	.. ,, 400,000 ,,	150,000 ,,

Among the banking institutions at Taonan, there are branches of the Bank of China, Bank of Communications, Government Bank of Manchuria, Commercial Bank, Hing Yeh Bank, Fengtien Savings Society Fengtien Yu Min Savings Soceity and a number of native banks including the Fu Ho Chang and Tsi Ching. Most of these banks have invested heavily in land, leaving little spare money for ordinary commercial transactions. The merchants constantly suffer from the tight money market.

Engineering Notes

New Power Company.—The Tobo Electric Company has decided to establish the Tenryugawa Generating Service Company by the end of next month.

Direct Railroad Communication, Berlin-Peking.—For the first time since 1914 through railroad tickets will be sold on May 15, 1927, from Berlin to Tokyo, Peking, and Shanghai, provided the home governments ratify the work of their delegates in Berlin, as expected. A ticket second class from Berlin to Tokyo will cost 650 marks, exclusive of sleeper. The actual distance from Germany to Japan is 12,000 kilometers, and the time required will be 11 days to Peking and 12 days to Tokyo. Travellers will have the option of going to Moscow via Riga or via Warsaw. In Moscow there will be a change of trains, and baggage will be checked through to destination.

Consulting Engineers in China.—The China Industrial Development Association recently organised with headquarters at No. 87 Rue d'Ypres, French Concession, Tientsin, is a pioneer firm of Chinese consulting engineers. The association is incorporated as a limited concern with the following objects: (1) to assist in the organisation of industrial enterprises, such as designing and making estimates, investigating and adjusting accounts and supervising works; (2) general brokerage on merchandise; (3) introducing investments, mortgages and expert service for various industries; (4) to conduct special researches and compile data for any particular industry, (5) to answer industrial inquiries; and (6) to secure official registration for new companies and trademarks. A score of returned students from abroad, specialised in chemical, electrical, mechanical, mining and civil engineering as well as expert architects, designers, accountants, lawyers, draftsmen, cotton-mill experts and dyeing experts are in charge of the various departments of the association, which is publishing a weekly under the name of the 'Industrial Mirror' as its official organ. Consulting engineering is an established profession in all modern industrial countries, but this association is the first of its kind in China, and answers the crying need of modern industry.

Asbestos Trade in Peking.—Asbestos is produced in many places in Chihli Province, Yinyehling, at Miyun, Hotzechien, at Changping, Hungmeichang, at Fangshan, Yichow, Laishui, Hwailu and Tsingsing being the most noted. The use of asbestos was not known to the local population until an asbestos company of Tientsin sent agents to Hotzechien to collect the material. There are at present only two asbestos companies in Peking, Pu Tsi and Siang Ta who collect asbestos at Yichow, Laishui, and vicinity. Chifengling, a hill 45 *li* to the northwest of the Yichow station, Chwanshuikow, at Yichow, Yangmeitung, Shuichwankow, Tsaochang and Lengshuichien, at Laishui, are rich in asbestos. It is dug by the farmers at their leisure and sold to the asbestos companies of Peking and Tientsin. The mineral is conveyed by mules from the place of production to Liangkochwang, whence it is shipped to Peking by rail. The distance between the mines at Laishui and Liangkochwang is 180 *li* of mountainous road and it takes five days to complete the journey. The asbestos with long fibers is used for manufacturing cloth, that with shorter fibers for padding cushions and pillows and that with the shortest fibers for making wall plaster. The Pu Tsi Asbestos Factory was started in Peking in 1924 by Lin Pu-shen, a native of Anhwei, with a sales department at Shunchimen Ta Chieh, producing asbestos cloth, ropes, boards, (used as an outer cover for steam heat pipes), plaster, cushions, pillows and material for wadding. Asbestos cloth two feet wide, is sold at 70 cents per foot, plaster at $7.5 per 100 catties, and wadding materials of five grades, at 20, 30, 40 and 50 cents per lb. The Siang Ta Asbestos Factory is located at No. 3 Tsaohaopu Hutung, Hsichiaochang, inside Hsichimen. It is a new establishment organized by Chin Tse-ming and produces only wadding and plaster, sold through Hwa Lu Co., at Fuchien Chieh, Peking. The plaster is of three grades, at $7.5, $6.5 and $5.8 per 100 catties respectively.

Liu I Weaving Factory, Shanghai.—The Liu I Weaving Factory, 256 San Yang Li, San Yang Road, Chapei, Shanghai, is increasing its production to meet the demand for woollen and knitted goods for winter wear. The company is engaged chiefly in manufacturing woollen or knitted shirts, sweaters, underwear and scarves. The factory maintains five departments, weaving, knitting, dyeing, spinning, and tailoring. The concern is a partnership of Hu Haichiu and Chen Hao-chu. It was established in 1925.

Motor-bus Competition in Java and Sumatra.—Motor-bus competition along certain sections of both private and State railway lines in Java and Sumatra, according to recent reports, appears to be assuming larger proportions.

The Pasoeroean Steamtram Co., Java, has endeavored to overcome this competition by inaugurating a similar automobile service in addition to the steam trams it operates; for this purpose it has placed an order abroad for four motor-busses.

Allied Machinery Company in Japan.—In his remarks to the stockholders at the annual meeting of the American International Corporation, Mr. Matthew C. Brush, president of the corporation, said: "Your corporation has disposed of its interest in all of its wholly owned subsidiary companies, except Allied Machinery Co. of America, in which instance arrangements to dispose entirely of the European branch of the business are in process. It is expected that the plan will be consummated within the next two months on a basis very satisfactory to the management. This will leave the Japanese branch of the Allied Machinery Co., which is continuing to operate and for which your corporation has received several tentative offers."

The Wireless Station at Pehchiko.—Nanking, was opened on November 28th last, and it is now in direct communication with most of the other Chinese stations. The cost for commercial messages is the same as that for telegrams.

The Telephone Administration of Tientsin is planning the installation of modern automatic telephones in the foreign concessions. The work of installing the equipment will commence almost immediately.

In order to facilitate the transmission of military dispatches, the provincial authorities of Shantung have decided to install a long-distance telephone system throughout the province, commencing with the ten districts in the Tsinan circuit. Preparations for the installation are now being made.

The long-distance telephone service between Mukden and Chengkiatun has now been opened to the public.

Osaka Sanctions Fast Line Scheme.—A bill sanctioning the establishment of the Nippon Electric Railway Company, Ltd., has been adopted by the Osaka municipal assembly. The bill was introduced the Osaka Prefectural Government. This company is being promoted under the auspices of Baron Seinosuke Goh, Mr. Kaiichiro Nezu, Mr. Keisuke Miyazaki, vice-president of the Daido Electric Power Company and other leading businessmen and financiers of Tokyo and Osaka.

According to the plan, this firm aims to connect Tokyo with Osaka by an electric line. The line will start at Shibuya, a Tokyo suburb, and terminate at Nakanocho in Osaka. The Osaka municipal assembly changed the terminus to Ichome, Enoe-cho, Higashinari-ku, Osaka, and then adopted the plan.

The firm is to be capitalized at Y.250,000,000, a quarter paid up. The plan was also presented to the Tokyo Prefectural Assembly last year but it so far has failed to discuss it either in the prefectural or municipal assembly. The proposed construction of an electric line between Tokyo and Osaka is a gigantic enterprise. The promoters intend to shorten the trip between the two cities by operating express electric trains. The most difficult problem confronting the plan is that whether the Imperial Government Railway authorities will allow it.

Imperial Chinese Paper Mill.—A dividend of .22 per cent. per share plus 8 per cent. official interest for 1926 was declared by the Imperial Chinese Paper Mill, 17 Rue Colbert, Shanghai, making a total of Tls. 30 per share. Payment began on April 11, 1927. The company is capitalized at Tls. 1,000,000 at Tls. 100 per share, bearing 8 per cent. interest per annum.

Japanese Sulphur.—The annual output of sulphur in Japan is estimated at 50,000 tons, about 85 per cent. of which is produced in Hokkaido. The price for sulphur f.o.b. Muroran or Aomori during recent years has been low, because of competition with the imported product, and the producing companies have not been financially successful. At present, however, quotations are somewhat higher as a result of a greater demand from paper mills, active exports to China and other countries, and the closing of the Okushiri mine in Hokkaido, which has been producing 15,000 tons per year. Local companies are now reported as operating on a paying basis and it is stated that several mines will increase their output during 1927.

Tokyo Gas Company Plans to Erect Two New Tanks.—The Tokyo Gas Company has decided to erect two large gas tanks in its Senju plant, one capable of containing 4,000,000 cubic feet and the other 2,000,000 cubic feet. Another 2,000,000 cubic feet tank also is to be erected in the compound of its Omori plant.

The gas supply in Tokyo is rapidly increasing recently. Last month the supply totalled 32,000,000 cubic feet, in contrast to 27,000,00 cubic feet for the same period of last year. This is an increase of 20 per cent. in a year, while the annual increase used to be about 15 per cent. until 1925.

Liehshan Coal Mines, Anhwei.—The coal mines at Liehshan, Suchow, Anhwei Province, were exploited before the establishment of the Republic, but were not worked on a large scale until 1914 or 1915, when the Pu Yi Liehshan Coal Mining Co. was started by Ni Ping-wen with Chinese capital of $1,200,000. Liehshan is 40 *li* northwest of the Fulitsi Station by land. Up to the present, six shafts have been sunk by the company. Three are new shafts, two are on the south section of the mines, yielding anthracite of good quality, to the amount of over 500 tons a day, and the other one is on the north section, yielding bituminous coal of somewhat inferior quality to the amount of over 100 tons a day. Hand labor is employed in excavation, but the coal produced is raised out of the pit by cages. Workmen also descend to the coal level in cages. Coal is conveyed by light railway down the hill, further transported from the foot of the hill to the river mouth at Fulitsi, a trip of 50 *li*, by a tributary of the Suiho, and thence again by light railway to the Fulitsi Station, 3 *li*. The company has a transportation department about a *li* from the station, and accessible by another light line. Work is carried on day and night, but divided into three shifts of eight hours each. Workmen number between 700 and 800. They work by shifts under the control of foremen. They are paid according to the output of the whole shift. This works out at about 1,000 cash a day. The wage of a foreman is about $20 a month. Liehshan coal is consumed principally in Anhwei and Kiangsu. The company's agents in various towns must find a bond before they may do business. Those in Hsuchow pay $8 a ton for anthracite but sell at the present retail price of $10 a ton. The cost of transportation from Fulitsi to Hsuchow by railway (60 cents per ton) is borne by the company; the agents need to pay only a small amount for conveyance from the Hsuchow Station to their depots, say, at 10 cents to 20 cents per ton. The net profit obtained by these coal agents on the sale of one ton of anthracite is therefore about $1.80 or $1.90.

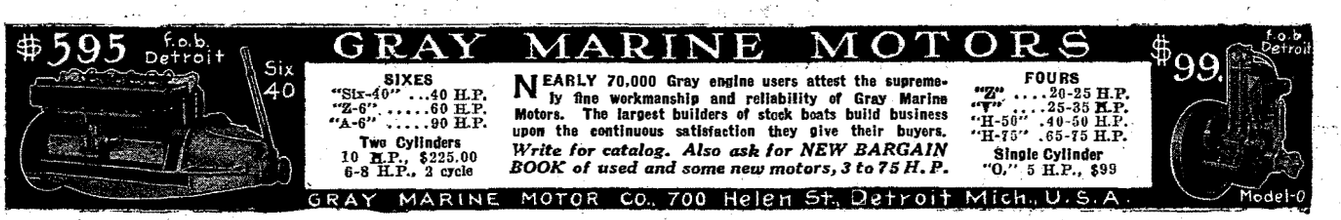
Radio Broadcasting.—The Chinese government bar against the use of radio in Manchuria except for military purposes has been lowered. During 1927 at least two broadcast stations will be built. Contracts have been let to a French firm for a two-kilowatt plant at Mukden to operate on 250 to 550 meters and an American concern is to install a one-kilowatt station at Harbin.

Waterworks in Chungking.—The authorities of Chungking, Szechwan province, are planning the installation of water works in the city. A company is being organised with private capital under official supervision. It is estimated that $600,000 will be required to instal the necessary machinery and to meet other initial expenses. The funds will be raised by public subscription or by floating a loan, according to a prospectus recently drawn up and circulated among the local inhabitants.

Railway Engineering Works in Kirin.—With a view to securing contracts for railway construction in Kirin province, Chinese and Japanese have orgainsed the Kirin Hing Yeh Railway Engineering Works in Kirin, the provincial capital, with a capital of 10,000,000 *yen*, shared equally between the Chinese and Japanese promoters. One quarter of the authorised capital was paid up upon the inauguration of the company, which took place on December 21, 1926.

Shanghai Municipal Electricity Department.—A net profit of Tls. 2,205,490 was realized by the Electricity Department of the Shanghai Municipal Council in 1926. This represents an increase of Tls. 359,040 over the estimated profit of the year. The total sales of electricity for all purposes were 408,245,810 kilowatt-hours and the revenue from sales of electricity, hire of motors, etc., Tls. 10,051,221. The gross profit after allowing for depreciation was Tls. 3,930,539. There were 43,378 consumers at the end of the year as compared with 38,932 at the end of 1925 or an increase of 4,446. The Department employed 188 foreigners on its staff, 104 Russians, and 3,360 Chinese in 1926; for 1925, the figures were 179, 113, and 3,035 respectively. A total of 226,190 lamps were in service within the Settlement at the end of 1926.

Shanghai-Hangchow Road.—A modern highway from Shanghai to Hangchow is planned to be constructed for motor traffic. Surveying has been completed. The projected road is to run through a number of densely populated towns and cities lying east of the Shanghai-Hangchow Railway. It will start from the neighborhood of the Kiangnan Arsenal in Shanghai to Minghong, following the existing Shanghai-Minghong motor road. From Minghong the road is to continue in a south-eastern direction through Tinglin and Changyen until it crosses the Chekiang border line at Yachien Pinghu district. From Yachien, it will pass through Chapu, a seaport belonging to Pinghu, Haiyen and Haining. From Haining it will follow the existing Haining-Hangchow motor road to Hangchow City and farther on to Nansingkiao, on the left bank of the Tsien Tang River. On the opposite bank of the river, a motor bus service is already in operation between Shaohing and Siaoshan. So after the completion of the projected highway, quite a number of prosperous districts not lying within the Shanghai-Hangchow Railway zone, will be brought into closer contact with Shanghai and Hangchow. Though the highway covers a long distance, the work of construction is not difficult. On both the Shanghai and Hangchow sides, two motor roads, the Shanghai-Minghong Road and the Hongchow-Haining Road, are already in existence. It is only necessary to connect these two lines. A special bureau will shortly be organised.



Kaiping-Fuchow Railway.—Various interests in Fengtien province have formed a syndicate to build a light railway from Fuchow to Kaiping, a distance of about 200 *li* in South Manchuria, with a view to facilitating salt transportation. Official permission has been obtained and construction work will be started in the spring, it is reported.

Students to Build Roads.—By order of the Civil Governor of Kweichow province, all students of Kweiyang, the provincial capital, over 15 years old are required to devote one day every week to road building. Every school is assigned a section of a road, on which the students are to work from 9 a.m. to 4 p.m. on Saturdays. The studentworkers will be awarded special honors upon completion of the roads.

Chinese Eastern Railway.—A total amount of 256,000,000 poods of freight and 3,250,000 passengers was carried by the Chinese Eastern Railway in 1926 as against 207,000,000 poods and 2,454,000 persons in the previous year. The following table shows the comparative figures of net profit made by the railway in the past years :

1912	4,918,000	roubles
1913	7,896,000	,,
1924	15,625,000	,,
1925	2,223,600	,,
1926	2,500,000	,,

Cement Manufacturers Plan 40 to 50 per cent. Reduction.—In view of the fact that the protland cement manufacturing industry in Japan, which has been hard hit by business depression in general, again has been dealt a severe blow on account of the moratorium, all the manufacturers are now planning a 40 to 50 per cent. reduction of products in order to regulate the stock.

All markets in this country are now sharing in a slackness, with a heavy decline of transactions, and as a result, the stock at present is more than 1,580,000 barrels, this being the highest figure for the past several years.

Rolling Stock on Government Railways.—According to statistics recently compiled by the Ministry of Communications, the Peking-Mukden Railway originally had 364 passenger cars, 4,412 freight cars and 236 locomotives, out of whcih, 176 passenger cars, 2,759 frieght cars and 52 locomotives have been transferred to other railways, while a number of cars belonging to other railways are now running on the Peking-Mukden line. On the Tientsin-Pukow line there were originally 385 passenger cars, 2,088 freight cars and 136 locomotives, of which 100 passenger cars and 539 freight cars have been taken to other lines, while a number of other railways' cars have been transferred to this line. Taken as a whole, however, the amount of rolling stock on both lines has been considerably reduced as a result of military operations.

Shanghai Waterworks Co., Limited.—A net profit of Tls. 614,246,45 for 1926 was realized by the Shanghai Waterworks Co., Ltd., 69 Kiangse Road, Shanghai,. The gross revenue for the year amounted to Tls. 2,021,947.50 as compared with Tls. 1,965,105.-93 for 1925. The balance of working account amounted to Tls. 1,072,192.83 for 1926 ; the figure was Tls. 1,093,399.37 for 1925. An interim dividend of 10 shillings per share at exchange 2/11 5/8 was declared and paid on July 28 amounting to Tls. 112,948.16. A final dividend of 30 shillings per share at exchange 2/5 3/4 for the year was declared, amounting to Tls. 405,741.18. The average daily consumption for 1926 was 33,849,444 gallons as compared with 29,615,121 gallons for 1925, an increase of 14.3 per cent. The maximum daily consumption for 1926 was 44,688, 425 gallons, and 37,716,317 for 1925, an increase of 18.4 per cent, and the maximum hourly consumption for 1926 was 2,843,000 gallons as compared with 2,491,000 for 1925, an increase of 14.1 per cent. The abnormal increase in demand was due to the particularly hot summer and the unquestioned increase in waste. The company is capitalized at £1,000,000 with 40,236 shares of £20 each and 195,280 shares at £1 each. The company issued debentures for Tls. 2,000,000 at 8 per cent. interest in 1921, for Tls. 500,000 at 8 per cent. in 1922 and Tls. 1,000,000 at 7 per cent. in the same year, and for Tls. 500,000 at 6 per cent. in 1925.

SULZER BROTHERS

SHANGHAI ENGINEERING OFFICE

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THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

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遠東時報

PROTECTION OF AMERICAN LIVES AND PROPERTIES IN CHINA

America is Committed by Every Conception of Honor and Good Faith to Support Great Britain and Japan in the Defense of Treaty Rights in China.

By George Bronson Rea.

Vol. XXIII July, 1927 No. 7

SHANGHAI, PEKING, TOKYO AND MANILA

Wireless Stations in Canton and Foochow.—The wireless station in the north suburbs of Canton has been completely installed. After successful tests, the station commenced transmission of messages on December 19. The wireless station in Foochow, capital of Fukien province, has also been repaired and put in communication with the station in Hongkong and along the coast in South China.

Extension of Trolley Lines.—The Shanghai Electric Construction Co., Ltd., 7-8 Soochow Road, Shanghai, has completed an extension of trolley lines from the end of Ward Road to the corner of Tongshan Road and Kwengming Road, passing through Lay Road Bridge Paoting Road, Dalny Road, Thorburn Road, and Whashing Road. The railless tram service was scheduled to begin at the end of March.

Shiuchow-Pingshek Road Kwangtung.—A recent report of the Highway Bureau, Kwangtung province, states that construction of the section from Shiuchow to Lokchong of the Shiuchow-Pingshek Road is nearing completion and traffic on this section is expected to be opened in the middle of June. The other section from Lokchong to Pingshek is being built and will be completed in August. The cost of construction of the whole road is about $660,000.

Foochow Motor Bus Service Company.—The Foochow Motor Service Company was started in 1918 with a capital of $150,000. The company has six motor buses, each capable of accommodating 40 passengers, eight ordinary touring cars for private hire and six motor lorries. At first regular passenger services were started on two routes : (1) between the South Gate and Taikiangsin, a town near Foochow and (2) from the South Gate to Makow. Since its inauguration, the company has had a chequered career. The service on the second route was later on suspended owing to poor business. In 1922, the company's cars were commandeered by the army, and the service was completely suspended for a while. It is reported that during the past six years, the company has suffered a total loss of $50,000-$60,000. The fare charged by the company is : from the South Gate to Taikiangsin, about 10 *li* apart, 10 cents, and to Nankungyuan for a distance of about 7 *li*, 15 coppers, or nearly 7 cents. From Nankungyuan to Taikiangsin, about 3 *li*, is 15 coppers. Cars for private hire cost $1.20 for a single trip from the South Gate to Taikiangsin or *vice versa* and $1.30 to Tientang 12 *li* away. If hired by the hour, the charge is $4 per hour. Up till quite recently, the company's average daily gross receipts amounted to about $150, which is barely enough to cover running expenses. Quite recently, the company's cars were again commandeered by the troops.

Insurance Risks in China.—The insurance situation in China is described as especially bad during the civil strife, but bad as well under normal conditions because of the peculair temperament of the Chinese merchant, said J, C. Huston, United States Consul to Hankow, China, at a recent gathering of foreign trade excutives.

"The principal fault lies in the Chinese courts, where it is impossible to get justice in any insurance case, especially where a foreign insurance company is involved," Mr. Huston said. "The companies have learned to avoid as far as possible the merchant risks as they have found that as soon as the merchant sees the market going against him, or business takes a slump, his first thought is to make the insurance company pay.

"Arson is probably more widely practiced than any other sin against insurance, so that fire insurance coverage it particularly bad for the companies. There seems to be no fear of being caught burning stock to collect insurance. All the neighbors seem to know in advance that if the merchant's stocks are not moving at a profit, or that some financial depression has struck him, he will have a fire as a natural resort for indemnification.

"In some instances, even the local fire deparment has warning of the impending fire, and makes the necessary preparations as to hose and apparatus in advance in order to protect the neighbors against the disaster. So that, if the local fire department shows signs of making ready its equipment, then the insurance firms know that there is to be a fire and take the proper steps. Even with all this warning and evidence, arson-convictions cannot be made."

Shimonoseki Tunnel.—The Moji-Shimonoseki Straits railway tunnel, construction of which was delayed by the earthquake in Japan, is to be constructed in 1928 by the Japanese government. The tunnel will do away with the ferry service connecting Kyusha and points in Honshu, which often is interrupted for twenty-four hours at a time by storms. The bore will cost $10,000,000 and 3,000 men will be engaged in the work.

Mukden-Hailung Railway.—The Mukden-Hailung Railway running from outside the North Gate of Mukden city, capital of Fengtien province, through Fushun, Tsingyuan and Shanchengtze to Hailung in Fengtien province, has been opened as far as Tsingyuan. The whole line is over five hundred *li* in length, traverses mountainous regions and involves the construction of two tunnels, 142 bridges and over 130 culverts. The major portion of this most difficult engineering work has now been accomplished, and the whole line is expected to be completed this summer.

Japan's Electric Bond Company.—Commenting on the organization of the new Japanese Electric Bond and Share Company whose initial capital was Yen 10,000,000. "Commerce of Calcutta says that "it is the outgrowth of the close association during recent years of American and English interests in connection with the financing of Japanese power companies in the New Work and London markets."

"Not merely in India are schemes of hydro-electrification being rapidly developed. For the last five years the world has watched with interest similar schemes reach fruition in Japan.

"The older companies have now passed the first stages of development and are gradually extending their lines to new centers of distribution, with consequent annual increases of generating capacity. In most cases their shares are selling above par and they have floated loans in America as well as in the Japanese money market.

"Two of the newer organizations are the Nippon Hydro-Electric Company and the Tokio Hydro-Electric Company which are most actively engaged in development work. Their early accomplishments are already bearing fruit and their shares are selling above the issued prices.

"The Nippon Company was originally planned about 1910. In 1919 the company was established with a capital of 50,000,000 yen for the development of three concessions or objects. The first project was originally called the Kansai Denryoku and was organized to develop about 60,000 kilowatts at Seto and other points along the Hida River.

"The second project was the Toyo Aluminum Company, established in 1919 to sell and manufacture aluminum, for which licenses for about 200,000 kilowatts of power were obtained along kilowatts fro mthe Joganji River.

"The third was the Etchu Electric Power Company, which added 10,000 kilowatt from the Joganji River.

"By bringing all these companies under one head and building a 200-mile 154,000-volt transmission line to Osaka with an enormous substation and 100,000 kilowatt steam plant at that great distributing center the company was in an immediate position to show a profit. The difficulty of installing all these stations was great and the program of development is still much hampered by delays in transporting equipment, for the nearest rail head is about fifty miles away. A great deal of the material is carried on a twenty-one mile ropeway.

"A 260-foot dam, one of the highest in the world, is being constructed. It is 1,000 feet wide, will require more than 400,000 barrels of cement and will impound 1,300,000,000 cubic feet of water. The enormous capacity of the dam will make this plant a standby for the rest of the Nippon system.

"At this plant will eventually be installed four 20,000 kva. double frequency generators with suitable step-up transformers and switchgear.

"Nippon Denryoku worked until recently on 50,000,000 yen capital, but a new stock issue of 50,000,000 yen, one quarter paid up, has recently been floated. This gives the company 100,000,000 yen in stock with 62,500,000 yen paid up.

"The demand for the new stock was so great that it commanded a bonus as soon as it was issued. The success of this great company seems assured."

Japan Orders Big Wireless Station.—What is believed the largest wireless station of its kind in the world was ordered recently by the Japanese Wireless Telegraph Company, according to a report to the Department of Commerce. The new station will permit direct communication between Japan and Western Europe. An effort will be made to complete it by the middle of 1928.

China & South Sea Bank Ltd.—A total net profit of $1,127,419.65 for 1926 was realized by the China & South Sea Bank, Limited, 4 Hankow Road, Shanghai. Out of the net profit, a total of $300,000 was paid as official interest on its shares at 4 per cent. per share. A total of $450,000 was appropriated for dividends amounting to 6 per cent. per share. The company is capitalized at $20,000,000. Its head office is located in Shanghai. Hu Yun is the general manager and Ma Chin sub-manager.

Japan's Textile Program.—A program for the development of domestic yarn and textile manufacturing industries in Japan has been worked out by National Government committees in Tokio, Osaka and Nagoya. The plan is the result of many months' study by these committees which were specially appointed and the preparatory steps have already been taken.

The program has these features: Improvements of the mulberry and cocoons to be effected; better methods of transportation in cocoons; increase of the industry's efficiency; establishment of a sales oragnization for raw silk; arrangements for money accommodations; reorganization of the silk industry.

The reorganization is laid out on these lines: Association methods; large mill organizations favored; a joint sales safe-keeping and accounting body; allowance by the Bank of Japan of discounts for this association against warehouse receipts; policy of producing only superior silk worm eggs, of regulating cocoon production and preventing careless manufacturing.

Showa Electric Plans Approved.—The Ministry of Communications has sanctioned the transfer of water power concessions and electric power stations held by the Daido Electric Power Company and the Kuhara Mining Company to the Showa Electric Power Company, organized by these two concerns. The Daido interests have the water power concessions along the Rivers Kuzuryu and the power stations and transmission lines, valued at Y.27,500,000 in all. The Kuhara concern has a concession along the Shogawa and power stations valued at Y.12,500,000.

The generating power of the Showa firm on the completion of its power stations and transmission lines is estimated at Y.40,000,000. Power is to be supplied principally to the Hokuriku district for industrial development. The proposed aluminum plant to be erected in Toyama prefecture is expected to buy power from the company. Stations and generating power along the Shogawa and the Kuzuryu are as follows:

Along the Shogawa

Stations—	K.W.
Shogawa No. 2	45,000
Shogawa No. 1	9,400
Tamuki	17,219
Sakaigawa	2,160
Kousugawa	26,600
Iijima	33,400
Kidani	9,400

Along the Kuzuryu

Hanabusa	9,300
Shimouchinami	2,300
Higashikatsuhara	1,300
Managawa No. 1	1,981
Managawa No. 2	7,086
Total	165,152

Transmission Lines

	Volts
1. Sasatsu-Funatsu-Atotsu, 20 miles.	77,000
2. Sasatsu-Osaka, 200 miles	154,000
3. Shogawa-Nagoya-Gifu 100 miles	154,000

Air Service for Shanghai.—A new passenger air service between Osaka and Shanghai, to begin this spring, is being planned by the Nippon Kokusaisha (Japan Aeronautic Company) of Osaka. A huge monoplane from Germany has been purchased for the purpose.

The plane will be able to carry ten passengers, besides two pilots, one radio operator and one mechanic.

Artificial Silk, Japan.—Increasing demand for artificial silk in Japan is expected to bring about a decided expansion of the industry in the empire this year. The country's present output is around 5,000,000 pounds annually, but yearly consumption is estimated at 11,450,000 pounds. This necessitates heavy importation. Three new large mills are to be constructed soon.

Mukden-Hailung Railway.—The Mukden-Hailung Railway was built up to Pehshanchengchen in April. Regular traffic opened to that point from May 1. The whole line is expected to be completed in two more months. The Hailung-Chaoyangchen section, 35 *li* in length, has been built up to the vicinity of Shahotze. The whole line will be completed in September this year.

Automatic Telephones, Canton.—Canton, China, is to have an automatic telephone system, installed by an American company, as soon as the war will permit. A contract has been signed for equipment to accommodate 7,000 subscribers, it is said, and it is expected that 3,000 will begin use of the lines as soon as they are installed. The cost of installation, it is reported, will be $700,000, but work is not expected to start until more normal conditions prevail in South China.

Transportation Bureau.—By agreement between the Fengtien and Shansi military authorities, freight traffic on the Peking-Suiyuan Railway east of Tatungfu is controlled by the former and that west of Tatungfu by the latter. The Shansi authorities have now established the Paotowchen-Tatungfu Li Shang Transportation Bureau at Tatungfu to take charge of goods traffic on the section under their control. Merchants requiring cars for transportation of goods should apply to the bureau instead of to the railway office.

Radio Broadcasting in Peking and Tientsin.—Offices in charge of radio broadcasting have been established in Peking and Tientsin. Anyone who desires to instal a receiving set in his residence is required to register with one of these offices. According to the regulations governing the installation of receiving sets, all equipment must be purchased from licensed shops. The user must pay an annual fee of $6-$12. Importers and sellers of radio equipment must register with the Office of the Superintendent of the Northeastern Long-distance Wireless Telephone Service from which licenses and passports may be obtained. Broadcasting of music, market quotations, news, etc. by radio in Peking and Tientsin is planned.

Carpet Wool From China.—The China wool business, which is of vital interest to the United States because of the vast amount of carpet wool that comes annually from this country, has been seriously disrupted by the war in China. Importations are cut off to a large extent, which places the American carpet industry under a severe handicap.

China is the principal source of carpet wool, supplying American manufacturers with some 60,000,000 to 65,000,000 pounds of the yearly consumption of between 100,000,000 and 150,000,000 pounds. Tientsin is the principal wool market and the exports through that port last year amounted to 18,640,000 pounds for eleven months, while in the same period of 1925 the shipments amounted to 48,800,000, and in 1924 the amount was 51,871,000 pounds.

Boston houses have decreased their wool orders in China materially since December owing to the uncertainties of deliveries. Receipts at American ports are likely to be relatively small for several months. This is unfortunate, because carpet manufacturing is in a healthy condition, requiring large quantities of wool, and the industry will have to turn to other sources of raw material.

Percie A. Green

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

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GOV.-GEN. LEONARD WOOD

BREAKING THE TREATIES BY TAXATION

SHANGHAI'S ELECTRICITY DEPARTMENT

COMMUNICATIONS IN CHINA

GOLD MINING IN HEILUNGKIANG

Vol. XXIII | August, 1927 | No. 8

The Reinforced Concrete Sleeper

By H. Stringer, B.A., A.M.I.C.E., Late Resident Engineer, Peking-Mukden Railway

IN China up to date the sleeper in almost universal use is the timber sleeper of Japanese hardwood, but its rise in price coupled with the fact that longevity in railway materials becomes increasingly desirable is the cause of renewed consideration of the possibilities of the concrete sleeper, cement being cheap, good and of local manufacture.

With the idea of investigating the actual strains to which a sleeper is submitted actual deflections were measured at three points, rail-seats, and centre of sleeper, and from this the actual deflection in the sleeper was deduced.

Experiments were carried out on 60-lb. track with a six coupled locomotive whose leading and maximum driving axle load was 12 tons. Two sets of trials were made with ballasted and unballasted road. Running speeds were about 15 miles per hour. As would be expected maximum deflections were realised under the unballasted tracks.

Unballasted Track—6-in. consolidated mud packing, 13 sleepers to 30-ft. rail, Maximum deflection, 0.1610 ins.

Ballasted Track—6-in. stone under sleeper, 13 sleepers to 30-ft. rail, Maximum deflection, 0.091 ins.

Ballasted track as above but with 10 sleepers to rail, Maximum deflection, 0.096 ins.

It was observed from these experiments that hog and sag tended to prevail over a length of from 4 to 5 sleepers as would be expected.

For the purpose of arriving at a value for the bending moment on a sleeper the average of the right and left deflections was taken for the calculation of curvature and experiments undertaken with a view to the determination of the value of E the elastic modulus of the timber. The formula used for calculation of bending moment being

$$M=\frac{E\,I}{R}$$

For the determination of E a series of deflection tests on small samples of sleeper wood were undertaken. These were of one inch width by two inches deep and were tested in an ordinary Buckton Machine for bending on a 12-inch span. The results obtained were unexpectedly variable. These results are tabulated as being of perhaps of some use for those who have to deal with Japanese

TIMBER

Load	A Red Wood Deflection	B White Oak Deflection	C Hiba Deflection	D Nara Deflection	E Wood Deflection	F Yachitomo Deflection	G Yachitomo Deflection
0.2 tons ...	—	4/64″	1/64″	3/64″	1/64″	2/64″	3/64″
0.4 ,, ...	2/64″	6/64″	3/64″	5/64″	6/64″	4/64″	5/64″
0.6 ,, ...	4/64″	12/64″	5/64″	6/64″	9/64″	8/64″	12/64″
0.7 ,, ...	5/64″	18/64″	6/64″	8/64″	13/64″	18/64″	28/64″
0.8 ,, ...	6/64″	Fracture	11/64″	11/64″	20/64″	35/64″	Fracture
0.9 ,, ...	8/64″		16/64″	18/64″	28/64″	Fracture	
1.0 ,, ...	12/64″		Fracture	Fracture	36/64″		
1.1 ,, ...	Fracture				Fracture		

	Ultimate Tensile Stress Extreme Fibre	*Modulus of Elasticity Tension*	
Red Wood	A 5.0 tons sq. inch.	1,550,000	
White Oak	B 3.6 ,, ,,	517,000	
Hiba	C 4.5 ,, ,,	1,034,000	
Nara	D 4.5 ,, ,,	620,000	
Sen Wood	E 5.0 ,, ,,	517,000	
Yachitomo	F 4.05 ,, ,,	775,000	
Yachitomo	G 3.5 ,, ,,	620,000	
Hailin Pine	3.37 ,, ,,	1,250,000	Manchurian timber
Oregon Pine	4.1 ,, ,,	2,000,000	

N.B.—*E* calculated from deflections under 0.4-ton load.

Finally it was decided to test larger specimens and this was done on a span of 6-ft. 9-in. using a 1-ton weight, as used for testing axles for a central load. This gave deflection of the order of the track deflections and was satisfactory in this respect, but again the results for apparently similar specimens showed considerable variation.

TEST OF 6-IN. DEEP BY 9-IN. SLEEPER.

Span 6-ft. 9-in. load 1-ton central, this giving a bending moment of 3,785-ft. lbs. The central deflection was 0.2100-in. and on removal of the load a permanent set of 0.12-in. was recorded. When the weight was dropped on the specimen from a height of 1-ft. 3-in. failure occurred revealing the presence of a bad knot in the centre.

The calculated value of "E" using the formula $M=\frac{E\,I}{R}$ was 698,000 lbs. per sq. inch.

TEST OF 6-IN. DEEP BY 4½-IN. SAMPLE AS ABOVE.

Test as above; the deflection was 0.12-in. and no permanent set resulted on removal of the load. This gave a value of "E" equal to 2,150,000 lbs. per sq. inch. When the weight was dropped on the specimen from a height of 7-in. a deflection of 0.24-in. was recorded, while with a drop of 12½-in., at which tension failure just occurred, the deflection was ½-in. Assuming "E" constant these deflections under impact were used to arrive at the static effect of a load falling this distance.

Using the formula $d=\frac{W\,l^3}{48\,E\,I}$ where "d" is deflection, W central load and "l" span. The following results were obtained

1 ton falling 7 inches equals 1.69 tons static
1 ton ,, 12½ ,, ,, 3.52 ,, ,,

The impact method was used later for testing concrete sleepers and this gives some indication of the order of the stresses under impact.

For the calculation of the bending moment on the sleeper which gave maximum deflection it was assumed that the curve of flexure was circular in the formula $M=\frac{E\,I}{R}$

For E equal to 2,150,000 the bending moment was 5,300-ft. lbs.
For E equal to 690,000 the bending moment was 1,700-ft. lbs.
For E equal to 1,500,000 the approximate mean and the usual value of E for timber the bending moment worked out at 3,700-ft. lbs.

To check these results it was decided to investigate the resistance moment properties of steel sleepers. It was found that the maximum Resistance moment for

	Approx. weight	
Rendel Steel Tie	135 lbs.	3,840-ft. lbs. at centre.
Post ,, ,,	90 ,,	3,540 ,, ,,

The following table* is an indication of steel sleeper practice in China and elsewhere and, if weights are an indication, it appears to indicate the adequacy of the Rendel Tie for such weights in China and of the adoption of a resistance moment of this order in concrete sleeper design.

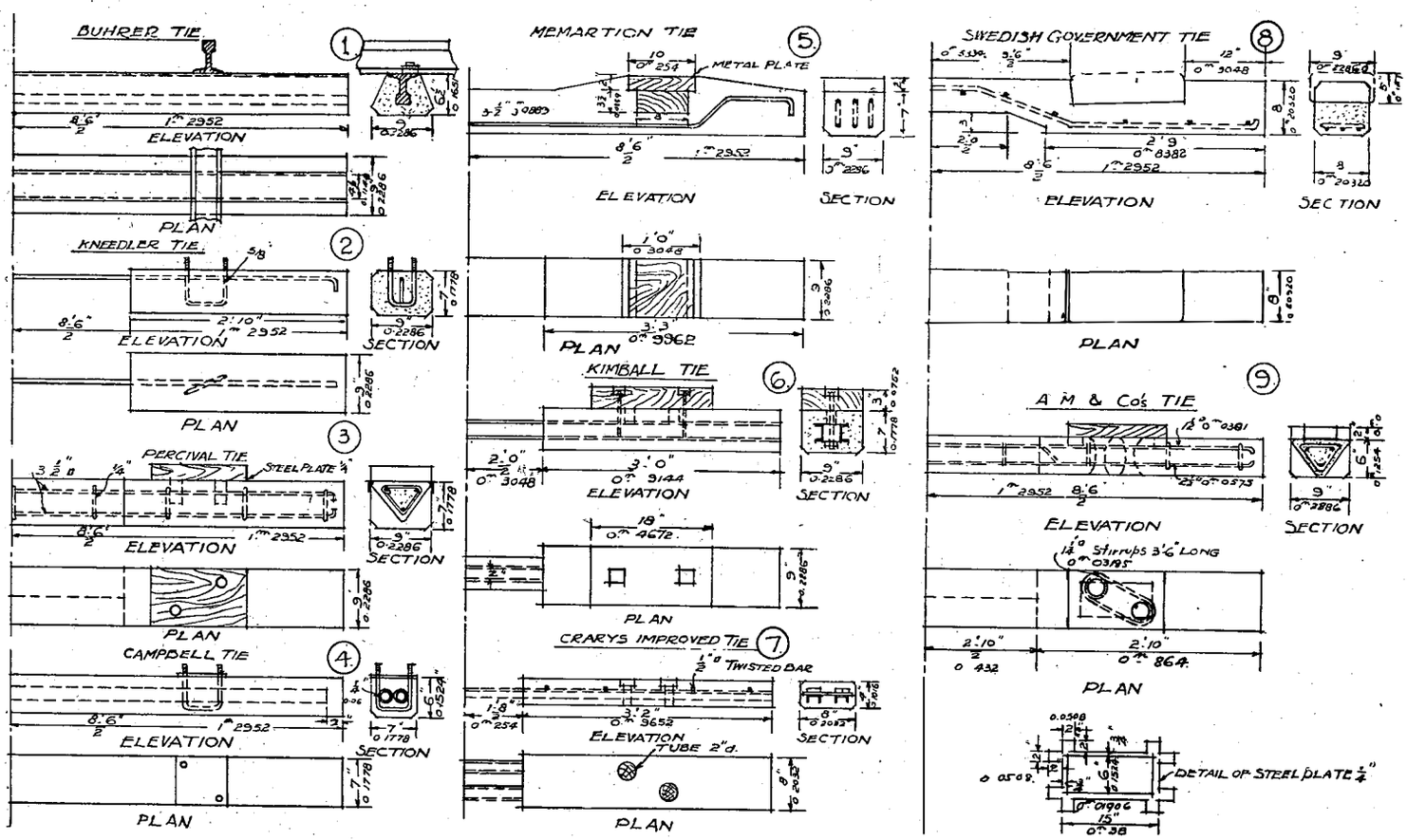
Railway	*Weight of sleeper* lbs.	*Number to mile*	*Ballast per mile*	*Weight of rail* lbs.	*Gauge*
German, S. W. Africa ...	26	—	—	30	2′ 0″
German, S. W. Africa ...	60.5	1,600	—	40½	3′ 6″
(Above information derived from "Railway Engineer" of February 1916).					
Sierra Leone	40.5	—	—	30	2′ 6″
North Nigeria	70	—	—	45	2′ 6″
South Nigeria	82	—	—	55	3′ 6″
(Above derived from "Railway Engineer" of April 1910).					
Rhodesia Railways	70	1,920	1,700 c. yds. sand lift	60	3′ 6″
Shire Highlands	70	—	—	41½	3′ 6″
(Above derived from "Railway Engineer" of February 1909).					
Lunghai Railway, China ...	131		length 39′ 8″	85	—
Woosung Railway, China ...	112	15 to rail	—	65	4′ 8″
				length 39′ 4″	
Yu-nan Railway, China ...	79.2	2,000	1,842 c. yds. gravel	50	Metre
Shantung Railway, China ...	110	1,760	—	60	4′ 8½″
India	139	2,000	8 ins. below	75	5′ 6″
India	70	2,000	6 ,, ,,	50	Metre
Australia	28	2,640	—	24	2′ 0″
Mexico, Southern	84	2,420	—	50	3′ 0″
Egypt	(110.2 (132.2	10 to rail	—	95 length 12 metres	

(*N.B.*—An earlier sleeper on the Mexico Railway weighed 64 lbs. and was removed. On the Inter-Oceanic Railway a 90 lb. sleeper is used under a 40 lb. rail for the same gauge. Information derived from Tratman on Track). *Extracted from "Pioneer Railway Engineering" by H. Stringer.

In the design of the concrete sleeper first adopted the reinforcement consisted of two old boiler tubes as in the figure. The ends of these tubes were flared to give increased adhesion. The concrete in all cases was 1.2.4 with $\frac{3}{4}$ inch stone or less. This sleeper was tested in the same manner as the wooden sleeper.

Applied bending moment 3,785-ft. lbs. deflection 0.12-in. on removal of all the applied 1-ton load there was no permanent set.

The sleeper was then tested by allowing the weight to fall through 2 feet and it broke too easily indicating overload.



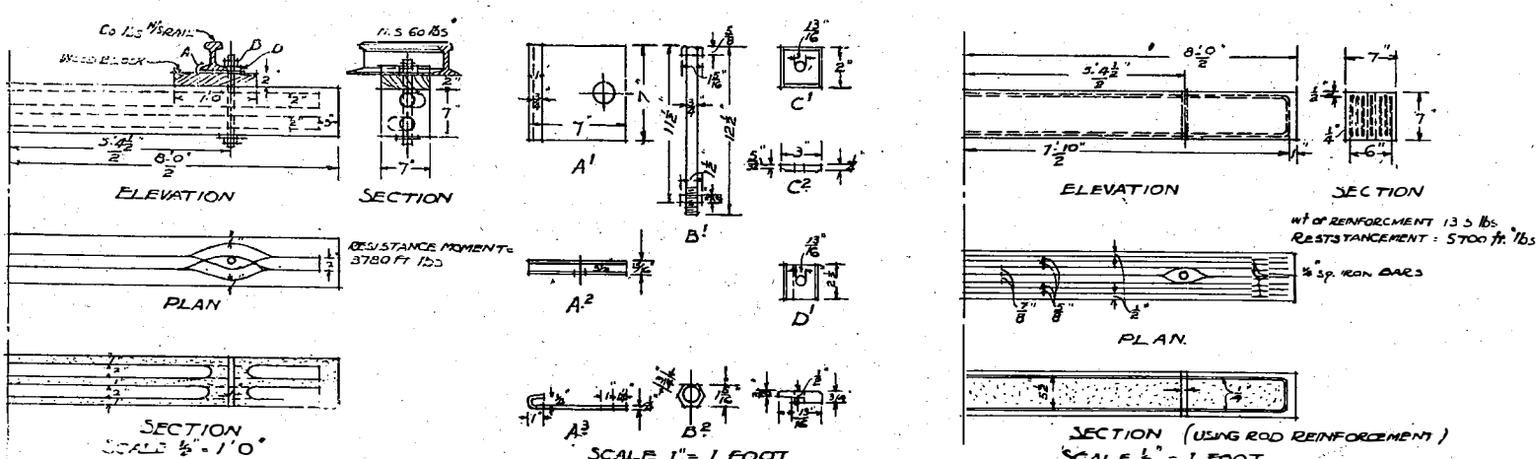
SCALE $\frac{1}{2}$" = 1 FOOT

TIE No	VAL UME OF CONCRETE CU.FT	WEIGHT OF REINFORCEMENT lbs	FITTINGS STEEL lbs	FITTINGS WOOD c.M.	COSTS # CONCRETE	COSTS # REINF	COSTS # FITTINGS	COSTS # TOTAL	R.M. CONCRETE FT. lbs. RAIL SEAT	R.M. CONCRETE FT. lbs. CENTRE
1.	2.00	170.00			0.68	18.50		19.18		
2.	2.48.	29.90.	3.76.		0.84	3 24	0 41	4.49.		
3.	3.10	24 00	5.10.	3.75.	1.05	2 60	0.93	4.58.	2857	1920
4.	2.15.	79.80	10.71		0.73	8.58	1 16	10.47		
5	3.76	23.00	18 40	6.00	1.27	2 49	2 60	6.36.	2543	3799 OR 4624
6.	2.63	64.00	3.13	8.25.	0.89	6.94	1 16	8.99.		
7	1.40	63.10	1.86	0.35	0.47	6 84	0 24	7.55		
8	2.69.	16.25	1 07	11.25	0.91	1.77	1 24	3.92.	3590	1439
9.	2.66.	25.30.	9.69.	4.57	0 90	2.74	1 50	5.14.	2084	1596

ASSUMPTION

COST OF CEMENT = $ 5 00 PER BARREL
" " BALLAST = " 6 00 " FANG. (= 6.0 CU. YARDS)
" " SAND = " 3 00 " " "
" " CONCRETE = " 9.12 " CU YARD.
" " TIMBER = " 10 00 " 100 BOARD MEASURE
" " STEEL = TAELS 1.75 " TON = $ 243 PER TON

PEKING MUKDEN RAILWAYS REINFORCED CONCRETE SLEEPER
(1 2 4)



A second sleeper was then tested of similar design and gave a deflection of 0.24-in. under the applied bending moment of 3,785-ft. lbs. but there was a permanent set of 0.06-in. on removal of the 1-ton load. When tested under impact this specimen just failed under a drop of 6 inches indicating no very high factor of safety if any reliance is to be placed on the static value obtained in the case of the wooden sleeper.

In calculating the resistance moment of these sleepers it was assumed that the area of steel 0.29-in. was concentrated (0.29-in. square being the area of each boiler tube) one inch below the concrete surface. The resistance moment for a beam reinforced for compression and assuming an extreme fibre stress of 600 lbs. per sq. inch for the concrete was 3,785-ft. lbs. or virtually the bending moment applied.

A test was also made on a sleeper used for sidings under light loads as in wagon repair sidings. This sleeper had a single boiler tube placed centrally, the concrete being as above and the fastening consisting of ordinary track spikes cast in the concrete, two only for each sleeper, spikes being placed to take the inner and outer edge of the rail flange alternately.

This sleeper whose calculated resistance moment is 520-ft. lbs. stood up under the applied bending moment of 3,785 ft. lbs. without showing signs of failure other than the development of permanent set.

In all cases the tubes employed for re-inforcement were scrap and this in all probability accounted for the failure which occurred, under trial and determined the adoption of rod re-inforcement as in the figure. In this sleeper the amount of re-inforcement has also been doubled that on *each* face of the sleeper amounting to 0.9 per cent. against 0.59 per cent. for each face of the boiler tube sleeper. Inspite of this it will be observed that the amount of re-inforcement is less than any of the usual types of concrete sleepers of which a table is appended.

The fastening for this sleeper had given no trouble up to end of 1925 and had been on trial for about two years. Altogether 70 sleepers with this fastening have been placed in the track under 14-ton axle loads (fully ballasted 60-lb. rail with 11 sleepers to the 27-ft. rail). There was only one breakage but cracks developed in 10 sleepers which did not develop so as to necessitate removal. The type with rod re-inforcement has developed no defects so far but has only been on trial for a short time; its calculated resistance moment as a beam re-inforced for compression is 5,700-ft. lbs. or more than the upper limit of bending moment deduced from the track deflection experiments. It is realised that the sleeper is heavy but its construction is very simple, the great desideratum in a foreign country.

An observation of a considerable number of failures of concrete sleepers indicate that the overwhelming majority fail in the centre indicating either a supporting pressure somewhat of the order in the sketch with a maximum pressure in the centre or an even distribution between the rail seat and practically no pressure at all outside this. This hypothesis appears feasible when it re-collected that shocks and vibration must have the greatest loosening effect on packing at the rail seats

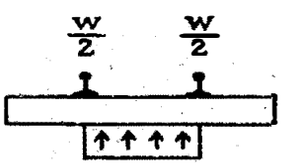


FIG. 1

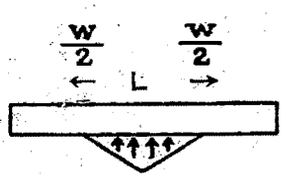
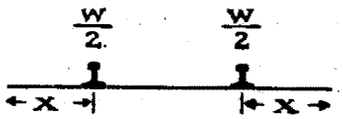


FIG. 2

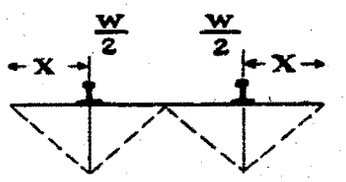
For the case represented in figure 1 the maximum bending moment on the sleeper is $\frac{WL}{6}$ and to produce the maximum recorded bending moment of 5,300-ft. lbs. would only require an axle load of 2.85 tons on the sleeper if L is assumed at 5 feet.

For the case represented in figure 2 the maximum bending moment is $\frac{5}{8}W$ and the axle load required to produce a bending moment of 5,300-ft. lbs. under the above conditions would be 3.8 tons.

If the supporting pressure is considered uniform and acting on the whole length of the sleeper (8 feet) the maximum bending moment is at the rail seat and is $\frac{W x^2}{2L}$ and this would need an axle load on sleeper of 16.8 tons to produce 5,300 ft. lbs. bending moment. Obviously the more nearly packing conditions approach to this state of things the better especially from the concrete sleeper point of view.



If the supporting pressure is as in the sketch below the maximum bending moment is at the rail seat and equal to $\frac{W x^2}{3L}$ requiring an axle load of 8.3 tons to produce the 5,300-ft. lbs. of bending moment.



Consideration of the wheel loads of the engine and the established fact that impact apart rail deflection under a wheel load does not extend over more than 3 sleepers and with distances apart of axles of wheels equal to from 2 to 3 times sleeper spacing maximum rail load does not exceed 39 to 44 per cent. of wheel load, seems to indicate that the last two conditions are impossible and that the real condition of things lies somewhere between the two pressure distributions first cited a contention supported to some extent by observation of failures. There may be high pressure at and outside rail seat after packing but this state of things does not persist.

Undoubtedly in these days longevity should outweigh economics. War conditions have amply demonstrated the wisdom of the adoption of an all steel road and a 39-ft. rail on the Lunghai Railway, and the use of the jarrah sleeper on the Shanghai-Nanking and Kowloon-Canton Railways.

However, with regard to the economics of the sleeper question in China, the cost in dollars of the boiler tube and rod re-inforced sleeper is $1.93 and $2.20 respectively against a cost of $2.25 for the Japanese hardwood sleeper. These costs are without fittings. As, showing the impossibility on this ground of introducing the steel sleeper with success at the present time, the following contrast between capital invested is illuminating.

Capital invested in steel sleepers weighing 150 lbs. costing originally $12.20 at the rate of $182 per ton (£26) and assuming 32 years life at 8 per cent. compound interest is $143.20.

Capital invested in Japanese hardwood sleeper 8 years life each and costing originally $2.25 under above conditions as to interest is $53.54. Convert to sterling at the rate of $10 to the pound. It is thus seen that until China elects to make the cheapest steel in the World, as she could do were foreign aid adequately enlisted, concrete is the only possible substitute for timber* which is rapidly deteriorating in quality. Unfortunately nothing is known of the life of the concrete sleeper at present so far as I am aware.

* Of late years it has been the practice on the Peking-Mukden Railway to buy Oregon Sleepers costing in 1925 $2.65 per piece.

The Shanghai-Nanking Railway at Nanking

Communications in China*

By Hardy Jowett, F.R.G.S.

ABOUT a century ago nothing seemed more praiseworthy to the foreign visitor than the road system in England. The means of transport from the ports to the capital by means of "magnificent and perfectly level high-ways, swiftly and without any vibration" with the sumptuous mail coaches travelling at ten miles per hour seemed to have struck strangers dumb. Even if he came from France where the art of road making was understood far better than in England, or at least was an older art, he was prepared if candid, to admire "the superior excellence of the roads, as compared with the generality of those in his own country."

When it came to the system of canals in England, even so captious a critic as the German Baron Dupin who, while not dazzled by the road system of England, was almost ecstatic in his praise of the canal system of that country. A country which "within the space of half a century had linked up opposite seas, river basins separated by numberless chains of hills and mountains, opulent ports, industrial towns, fertile plains, and inexhaustible mines, a system of more than 1,000 leagues in length, upon an area not equal to one fourth of France" he had to express himself in superlatives.

Ricshas in the Tientsin Native City

What he would have said had he visited China then or a century earlier is not possible to imagine but that he would have been lurid in his praise admits of not doubt. No country in the world is as fortunate as China in her waterways. It is possible to proceed from Shanghai to Canton *via* the upper reaches of the Yangtze River the whole length by junk, and the ramifications of waterways, rivers linked up by canals are astonishing.

Even in the matter of roads the China of several hundreds

* "The Oriental Engineer," June, 1927.

Engineering Notes

Kalgan-Tolunnoerh Light Railway.—The application for permission to build a light railway from Kalgan to Tolunnoerh (Dolonor) by a merchant named Hwang Yu has been provisionally sanctioned by the Ministry of Communications. The applicant is required to apply for formal registration within one year and submit a detailed report of the project.

Nanyang Brothers Tobacco Co., Ltd.—A total net profit of $2,300,894.40 was realized for the financial year ended October 31, 1926, by the Nanyang Brothers Tobacco Co., Ltd., cigarette manufacturers and leaf tobacco importers and exporters as against $1,220,077.06 for the previous year, according to their seventh annual report. The following appropriation was authorized: $115,044.72 as ordinary reserve, $295,754.91 as special reserve, $1,200,000.00 as interest on shares, $73,938.72 as rewards for services, and $123,231.21 as encouragement fund to staff, leaving a balance of $492,924.84 to be carried forward to the next account together with the balance of $638,314.18 brought forward from the last account, making a total of $1,131,239.02. The company is capitalized at $15,000,000.00 at $20 per share. It has at present an ordinary fund of $1,004,027.19 and a special reserve of $3,451,854.53. The president of the company is Kan Yok-kai and the vice-president Kan Hung-chiu. The auditors are Jackson Lau and Chou Ching-chuen. The head office is located in Shanghai with branches in Tientsin, Hankow, Hongkong, and other places. In Shanghai the company has a main office at 144 East Seward Road, a factory at 1-2 Dent Road and another in Pootung, and a sales building at 390 Nanking Road and another on North Szechuen Road.

Shale Oil in China.—A long-awaited event of considerable importance took place recently at the Fushun Collieries in Fushun Fengtien Province, China, when the first fire was built under the recently constructed experimental shale oil distillation furnace says Vice-Consul A. I. Ward, Mukden, China, in a report to the Department of Commerce.

This furnace, which holds 40 tons of oil shale, is the first of 48 to be constructed. They are to be 3 feet in diameter and 50 in height, and will be arranged in 3 batteries of 16 furnaces each. After considerable experimentation, it was decided to adopt an internal heating system in preference to the Scotch system, and a method has been devised whereby the gas will be returned to the furnace and used more than once.

An initial appropriation of about $145,000 was made for the construction of the experimental furnace. The first oil was drawn off October 7 in the presence of some officials representing the Japanese navy. About a year ago a smaller experimental furnace of only 10 tons capacity was used. Oil from this small furnace was sent to the Japanese naval fuel depot at Tokuyama, where it was found that by mixing one part of the shale oil with two of crude Borneo oil a product of satisfactory quality for use on naval vessels was obtained. Distilling will be continued in the new 40-ton furnace for the purpose of determining if this furnace produces an oil of quality equal to that product in the 10-ton experimental furnace. Present indications are said to be that the results are satisfactory, and that it appears likely that the construction of the remaining furnaces will be commenced early this year.

The total cost of the forty-eight 40-ton furnaces will be between $2,000,000 and $2,500,000 or about $970,000 less than Scotch type furnaces of like capacity. In addition to producing shale oil, of which the anticipated annual production is placed at 25,000 tons, such by products as crude paraffin, sulphate of ammonia and coal tar are to be produced. The shale from which the oil is extracted is found in great quantities at the Fushun Collieries, and can be mined at slight expense, as it lies between the coal seam and the overburden. As the greater portion of the coal mined at the Fushun Collieries is taken from open cuts, heretofore it has been necessary to remove this oil shale together with the overburden before the coal could be reached. The successful exploitation of the shale oil project will, it is said, render Japan much less dependent on outside sources of heavy oil.

C.E.R.-T.S.R. Through Traffic Opened.—Through traffic on the Chinese Eastern and Trans-Siberian Railways has been resumed since May 15, according to a Harbin report. The service has been interrupted since the Great War.

Telephone Service between Peking and Dairen.—Connection between Peking and Dairen in Kwantung Leased Territory by Chinese and Japanese long-distance telephone services has already been established. The Dairen-Taonan line is also in operation.

Railways in Manchuria.—"There has been more railway expansion in Manchuria during recent years than in all the rest of China, and the consequent increase in prosperity of the Three Eastern Provinces is indicative of what might be effected elsewhere in China if the country were permitted to enjoy a period of peace," says Mr. R. L. Warren, Commissioner of Customs at Mukden in his report for 1926.

Dredging Operations in Hai Ho, Tientsin.—As a result of spring thaw on the upper reaches of the Yung Ting Ho, water carrying mud and silt is flowing from the Yung Ting Ho into the Hai Ho, in Chihli province, in unprecedented volume. This has caused an accumulation of much mud and silt in the Hai Ho at Tientsin, and is giving much inconvenience to navigation. It is estimated that 143,000 *fang* (each *fang* being about 100 cu. ft.) of mud are being poured into the Hai Ho daily. The four dredgers of the Hai Ho Conservancy Works are only capable of scooping out 2,400 *fang* a day. According to expert opinion, one of the fundamental solutions is the opening of a new course for the Yung Ting Ho leading direct to the sea.

Recent Improvements in Kwangsi.—(1) *Motor Roads.*—Motor road construction was started in Kwangsi province in 1922, the first public highway built being the Kweilin-Chuanchow Road. This was followed by the roads built by private organisations in Watlam district while other roads running from Liuchow to Nanning, from Liuchow to Kingyuan and from Nanning to Lungchow have either been constructed or are under construction. Traffic on all these roads is expected to be formally opened in August this year. For service on roads in Liuchow district alone 150 motor cars have been ordered. Funds appropriated for highway construction in the province last year amounted to $810,000 in round figures. (Cf. "Road-Building in Kwangsi Province," *Bulletin*, No. 297). In his Trade Report for 1926 (just published) Mr. H. B. Hawkins, Acting Commissioner of Customs at Nanning, Kwangsi, writes: "Road construction under trained direction was pushed forward energetically by the Kwangsi Department of Public Works in 1926. Nanning motor-cars are now driven miles across the hills into the country over roads solidly constructed according to modern technical requirements. The road improvements now in progress are designed, not only to develop the surrounding districts, but ultimately to connect distant parts of the province and to open up new outlets to river, sea, and frontier."

(2) *Wireless.*—The wireless station at Wuchow was the first of its kind built in Kwangsi province, and is capable of communicating within a radius of 1,500 miles. Larger and more powerful stations to reach 2,500 miles are being installed at Kweilin, Nanning, and Lungchow.

(3) *Tung Trees.*—Kwangsi province produces the largest quantity of wood oil obtained from *tung* trees in South China. All wood oil exported from Hongkong is Kwangsi product. In Liuchow district, 25,000,000 seedlings of this plant have been planted this year.

(4) *Mining.*—Kwangsi is especially rich in tin and manganese deposits, many of which are being worked with success. The minerals are marketed at Hongkong.

(5) *Mint.*—Kwangsi used to import coins from Hunan province. But a mint has been installed recently. It started operations from January this year, and is turning out $10,000 in 20-cent pieces daily.

Kiaochow-Tsinan Railway.—The following table is interesting as showing the yearly average of freight and passengers carried during the three stages of the Kiaochow-Tsinan Railway, *i.e.*, under German, Japanese and Chinese management. The actual figures for 1926 are 1.7 million tons freight and 3.4 million passengers.

		Freight	*Passengers*
1905-12	German	575,000	844,000
1915-22	Japanese	1,444,000	2,341,000
1923-26	Chinese	2,029,000	3,767,000

Shanghai Electric Construction Co., Ltd.—A dividend of 10 per cent. for 1926 was declared by the Shanghai Electric Construction Co., Ltd., 7-8 Soochow Road, Shanghai. The traffic receipts for the year had increased by £50,500 as compared with 1924, and the operating expenses were £39,476 higher, leaving a net improvement of £11,024 in the operating profit, according to its annual report for 1926. The balance for appropriation was £17,631 higher than in 1924. The increase in operating expenses was due to higher prices for supplies and a definite increase in the wages paid to the operating staff.

Kirin-Hailung Railway.—The construction of the Kirin-Hailung Railway in Manchuria was formally started on June 25. The whole line is expected to be completed in the summer of 1929. The railway, covering a total length of about 40 *li*, will have 13 stations, each at an interval of about 30 *li*. The line will terminate at Chaoyangchen . The section between Chaoyangchen and Hailung, about 70 or 80 *li* apart, will be constructed by the Mukden-Hailung Railway Administration. As the line traverses a country which at present is in an economically backward state, five commercial ports will be opened for trade development. These include Hwangchitun, Shwanghochen, Yentungshanchen, Panshih and Chaoyangchen. Among these Chaoyangchen and Yentungshanchen are of greater commercial possibilities than the others. As the present town of Chaoyangchen is situated on a low plain and subject to periodical inundations, a new commercial quarter will be built on a more elevated site, above five *li* east of the present town.

Motor Vehicles in Fukien.—The rapidly increasing number of motor vehicles in use in the inland districts accounts for the higher shipments of gasolene.—*Amoy Customs Report, 1926.*

G.I.P. Main Line Electrification.—A short time ago the High Commissioner for India placed with the British Thomson-Houston Co., Ltd. the order for the complete sub-station and Track Sectioning Equipment for the Electrification of the Main Lines of the Indian State Railways from Bombay to Igatpuri and from Bombay to Poona, which is being carried out to the plans of Messrs. Mers and McLellan.

The alternating current supply is at 95,000 volts, three phase, 50 cycles, and at the substations it is converted to 1,500 volt direct current, by means of step down Transformers and Rotary Converters, each Rotary Converter unit comprising two machines in series.

There will be 7 Double Unit sub-stations and 4 Triple Unit sub-stations, so the total number of Rotary Converters will be 52, having a rated output of 1,250 k.w. each. The total output installed will therefore be 65,000 k.w.

The system of operation differs from the fully automatic equipment supplied by The British Thomson-Houston Co., Ltd. for the Natal Electrification of the South African Railways, in that approximately half of the sub-stations will be semi-automatic, and from these the remainder will be controlled by supervisory control apparatus. The Track Sectioning Cabins will be automatic giving back indication by means of supervisory control apparatus to the attended sub-stations.

The execution of this order will provide a considerable amount of employment at home since The British Thomson-Houston Co., Ltd. are manufacturing at their own Works at Rugby and Willesden the Rotary Converters, Control Gear, 95,000 volt switchgear and Lightning Arresters, and 1,500 volt switchgear, while the sub-contractors to The British Thomson-Houston Co., Ltd. for the Transformers are The British Electric Transformer Co., Ltd. and for the Supervisory Control Equipment, Messrs. The Standard Telephones & Cables Ltd.

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HOW CHINA LOSES HER FRIENDS

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Vol. XXIII September, 1927 No. 9

SHANGHAI, PEKING, TOKYO AND MANILA

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The Chinese Eastern Railway in 1926*

THE Chinese Eastern Railway traverses an extensive territory, but little explored as yet in its larger part never surveyed exactly and with a population of 14 million persons.

Up to the present time the railway remains the most important route serving the transportation requirements of North Manchuria.

Opened for traffic in 1903, the Chinese Eastern Railway acquired exceptional importance for the country in a comparatively short period as the basic artery of its colonization, and turning the formerly barren stepps, with a scanty population of nomads, into a rich agricultural district which annually places upon the market over 150 million poods of grain surplus.

The general technical standing of the railway and the most recent steps in its economic activity may be observed from the following data.

Ways and constructions.—The length of the permanent ways of the Chinese Eastern Railway towards the beginning of the building season of 1926 was somewhat above 2,800 versts, of which over 1,600 versts represented the main track.

More than one half of the rails (type of the C. E. Railway) had seen service for more than 25 years.

The continuously growing loading per axle of the rolling stock, which at present has been raised to 18.5 tons for the American gondola cars of the C. E. Railway, and the maximum pressure on the axle of locomotive—to 21.80 tons, as well as the tendency to a further increase of this pressure, have called forth the necessity of replacing existing rails by a heavier type of rail.

Since 1926, according to a plan approved by the Board of the Railway, the rails to be replaced began to be replaced by new ones, weighing 32.43 pounds per running foot, or 43.57 kgr. per running meter, and of a length of 6 sajens. In 1926 on the mountain defiles of the Eastern line and on the Southern line in all new rails of this type were laid over 124 versts. The rails removed from the main line were used for the individual replacement of rails on the same main line and for the replacement of rails of the light type—on station sidings, because the latter are too weak to bear the traffic of the heavy American gondola cars.

The ever growing loading per axle of freight trains, the increase in the number of cars making up a train, and the considerable speed of passenger trains induced the railway to proceed in 1926 to the replacing of the sand ballast with broken rock, thereby giving the roadbed greater stability.

In order to reinforce the track an additional sixteenth sleeper was placed under the rails on the main line where necessary.

Individual replacement of sleepers on the main line and on station sidings for purposes of development and reinforcement was also effected, over 480,000 sleepers being used in this connection.

The 35 sajens long girders of the bridges over the rivers Sungari I and Sungari II were reinforced and the girders of the bridge over the Nonni river were also strengthened.

The reinforcement of the roadbed of the main line where it crosses the inundated area of the Sungari II river was concluded.

A development and laying of new sidings and dead-end sidings at stations and junctions was made in order to increase the carrying capacity of the line.

Steps were taken to increase the safety of traffic and the operating efficiency of stations by introducing the block system for switches and semaphores according to the system of Sheremeteff.

In 1926 the main line was subjected to an allround checking of levels and grades, and on the strength of this investigation a plan is being drawn up for correcting the projected line in places where trains have been torn as under more than once, and also in order to correct the profile of the line according to new actual requirements in connection with changes in climatic conditions, the topography of the country and the growth of traffic.

Very considerable current work was done to the amount of about Roubles 3,500,000 for the maintenance of the permanent way and the proper upkeep of artificial constructions.

The development of traffic between Harbin-New Town and the Pristan called in 1926 for a replacement of the existing wooden viaduct for horse and automobile traffic, which had been credited during the construction of the railway, by a permanent concrete structure, which was opened for traffic on November 7, 1926.

Besides, in 1926 work was done for the impovement and upkeep of civil constructions of the railway at an expense of Roubles 2,840,000. This is explained by the great number of buildings owned by the Chinese Eastern Railway and which is a distinguishing feature of it when compared with other railroads. Thus, the railway possesses 220 thousand square sajens of buildings with heating arrangements, and 19 thousand sajens without the same.

In spite of the large area of civil constructions (as compared with other railways), still the housing arrangements for the staff of employees and workmen are insufficient.

A part of passenger buildings, rest-houses for locomotive and train crews, as well as certain office buildings do not correspond by their size and equipment to the requirements of the growing traffic.

The school buildings and other buildings for educational and cultural needs are absolutely inadequate to meet the existing demands, and a great many of the existing ones far from complying with hygienic requirements.

In order to correct all these deficiencies and in accordance with a decentennial plan, in 1926 there were erected 6,481 square sajens of buildings with heating arrangement.

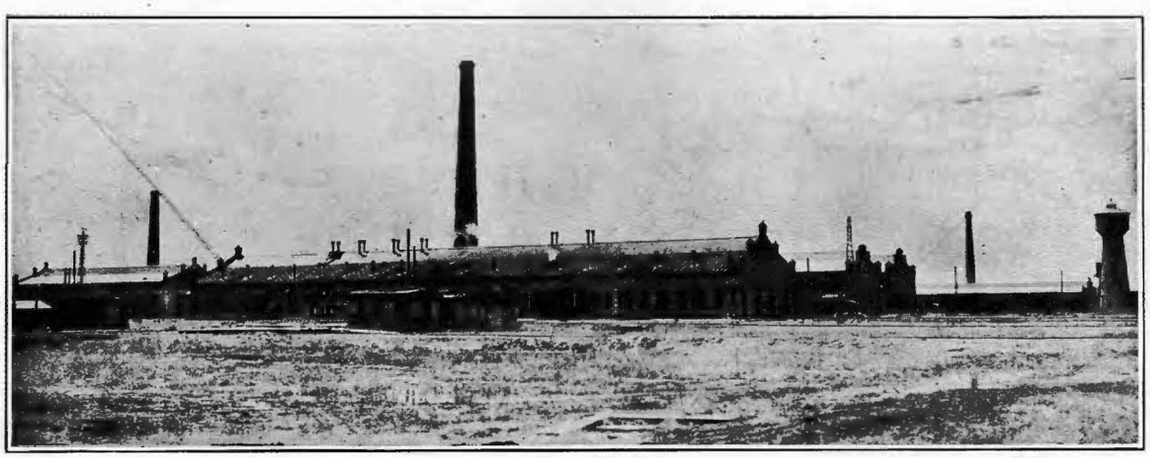
Of these, 1,708 square sajens were completely finished during the past building season and the remaining 4,773 square sajens will be finished in 1927.

The total budget of the Maintenance of Way Department amounted to about Roubles 12,900,000 in 1926, inclusive of expenses for auxiliary enterprises and expenses for the account of other departments.

The program of works scheduled for 1926 was carried out in full.

Rolling stock and motive power.—The rolling stock of the Chinese Eastern Railway on hand on January 1, 1927, was as follows:—517 locomotives, consisting of 83 passenger locomotives, 276 freight decapod locomotives, 13 eight-wheeled locomotives, 124 twelve-wheeled locomotives and 21 tank locomotives, 597 passenger coaches (158 on 4 axles and 439 on tow and three axles) and 12,217 freight cars.

It was one of the principal problems in the year under review to carry on the



Railway Car Shop in Harbin

* Manchuria Monitor

work of the preceding years in respect of the best possible utilization of the park of locomotives and a saving in fuel. The trials of long runs of passenger and freight locomotives, which were made in 1926, gave excellent results, and in 1926 the system of long runs was applied for the first time during the whole year.

The immediate results of this system were: 1. a reduction in the number of locomotives in operation, which was of particular importance in 1926, when very large transportation requirements demanded intensive work on the part of the railway; 2. a reduction in the number of divisional depots from 6 to 4; 3. a reduction in fuel consumption, and 4. a reduction in expenses for repairs. Besides, the weight of trains is being increased on certain sections of the line, which also made it possible to use the park of locomotives in a more rational way.

The improvements obtained may be observed from the following data:

	1924	1925	1926
Number of locomotives in operation ..	137	131	117
Percentage to the total number of locomotives on hand	25.5	24.8	22.5
Fuel consumption in Gold Roubles per 1 million net pood-versts	25.3	24.4	20.28

To form a correct estimate of these results one should bear in mind that the total work handled by the railway in 1926 was of a record figure, having exceeded the turnover of freight traffic in the preceding year by more than 20 per cent.

This fact even more enhances the importance of the achievements obtained because with less work of the park of locomotives and less fuel expenses a larger number of pood-versts was performed.

Thus, per 100 versts of the run of locomotives the following number of pood-versts was performed (in millions):

	1924	1925	1926
Gross	2,739	3,010	3,210
Net	1,505	1,681	1,923

Work in connection with the repairs of the rolling stock was carried on during the entire year; in addition to a complete execution of its own working program 600 freight cars of the Ussuri Railway were repaired as well.

The following principal improvements of the rolling stock should be noted: equipment of seven locomotives with steam superheaters of the Schmidt system; equipment of 12 locomotives with independent turbo-generators for electric light; equipment of 28 passenger coaches with electric light and replacement of the weak coupling gear of 315 freight cars and the normal axles of 839 cars with reinforced ones.

In order to obtain the best possible utilization of the park of cars work was carried on for the increase of the loading capacity of such cars, whereby for 1,219 ordinary convention cars the loading capacity was increased from 1,000 to 1,200 poods and for 135 2-axle American cars—from 1,200 to 1,500 poods.

Electric equipment was installed in seven water towers and additional hydraulic taps were fixed so as to improve the water supply of the railway.

Supply of material.—Side by side with general attainments in the domain of the motive power department of the railway, a number of measures should be noted tending to improve and make more rational the preparation of fuel and purchase of various material, which business was in charge of the Material Department.

The record taken of the fuel and material stored in the storehouses of the railway, which was effected in 1925, proved that the railway was storing a large quantity of logn-lain fuel and obsolute material, a dead capital, which was then liquidated by a well-planned consumption and also by the sale of material not required by the railway.

The Harbin Station

The rejuvenation of the fuel reserve was brought to an end in 1926 and on January 1, 1927, the storage compounds of the railway held only the high quality fuel prepared in the course of the preceding year, valued at Gold Roubles 3,800,000, or by Roubles 1,600,000 less than the balance on hand on January 1, 1926.

The reserve of old material was reduced by 50 per cent. In 1926 a new system was also applied for purchases to the effect that any new material should be delivered to the railway in the beginning of the building season, and not in autumn, as was done during the preceding years. The general consumption of all material supplies and fuel in 1926 amounted to Gold Roubles 16,700,000.

Turnover of freight and work of the railway.—The freight turnover of the Chinese Eastern Railway in the year of 1926 reached the hitherto unprecedented figure of 327,6 million poods, exceeding by 24.2 per cent. the freight turnover of the railway in the foregoing year of 1925 (263,8 million poods), whereas the increase for the preceding year had not exceeded 10 per cent.

The production of pood-versts also increased, as compared to the foregoing year by 16,277 million pood-versts, or 21.1 per cent. considerably surpassing the average annual increase of pood-versts in the preceding years.

The success achieved in this respect in the quantity of goods hauled is noticed more clearly, when one studies the nature of these commodities. The totals hauled by the railway in 1924, 1925 and 1926 are in the following manner sub-divided into commercial goods, service stores and military stores (in millions of poods and in %%):

	Commercial goods of great, small and passenger speed		Service Stores		Military Stores	
1924	184.8	76.8	53.3	22.1	2.6	1.1
1925	210.4	79.8	51.9	19.6	1.5	0.6
1926	256.0	78.2	70.0	21.4	1.6	0.4

The average per diem work of the railway, affected in order to handle this volume of freight, was for the past fiscal year equal to 1,009 cars, or by 180 cars larger than in 1925.

In an effort to produce as many pood-versts as possible with the use of a minimum of transportation facilities, the following results were obtained:

Possessing a park of cars on hand amounting to 12,217 cars (in convention units), wherefrom it was possible to use for traffic an average of not more than 8,140 cars (in convention units), the railway produced:

	Millions of pood-versts of great & small speed goods	Consumed: Thousands of car-axle-versts	Consumed: Thousands of train-versts	Average working car park	Average working Locom-park
1925 ..	77,284	229,843	4,103	4,109	56
	93,561	261,109	4,502	4,048	51

Therefore, with an increase in the number of pood-versts produced by 21.1 per cent, the car-axle-versts consumed increased by 13.6 per cent. only, the train-versts by 9.7 per cent. with an almost stationary park of cars and a smaller number of locomotives in operation.

Such positive results in the operating department were obtained by a number of steps both as regards the utilization of the means of transportation in the dimension of length as well as their utilization in time.

Measures tending to improve the utilization of tonnage.—To form a judgment of the efficient utilization of the tonnage in the year under review, one should in the first place dwell upon the *average per axle of a loaded car*, where the coefficient is systematically increasing from year to year (in poods):

1923	1924	1925	1926
466	488	500	519

These positive results where obtained through the putting into circulation of a considerable number of cars with a greater loading capacity. This, in 1925, 44 through traffic trains were in

operation, consisting of American 4-axle covered box-cars and gondolas; in 1926 there were already 53 such trains.

Besides, in 1926, 1,339 cars with a carrying capacity of 1,200 cars the so-called 20 ton cars, reconditioned from the ordinary box cars with a capacity of 1,000 poods, were put into circulation, and 155 Canadian cars, the displacement of which was raised from 1,200 to 1,500 poods.

The growth of the export traffic in 1926, as compared to 1925, necessarily lead to an increase in the haulage of empty cars; however, owing to steps taken for the transportation of service stores it became possible even to cut down the annual percentage of empty hauls from 32.2 per cent. in 1925 to 30.6 per cent. in 1926, and thereby obtain an increase in the average loading per axle of a freight car (loaded and empty), which is more considerable than the increase in the average loading per axle of a loaded car, which may be seen from the following comparative data about the modifications of the respective coefficient:

1923	1924	1925	1926
300	321	336	358

Measures for improving the utilization of cars in time.—Having obtained such favorable results in respect of the utilization of cars as regards their dimensional operation, *i.e.*, an economy in the number of car-versts, the Chinese Eastern Railway in 1926 gave serious attention to an improvement in the time work of the cars, *i.e.* an economy in the number of car-hours.

The measures taken in this direction consisted in the first place in a permanent control over the demurrage of cars, and, in the second place, in putting the working park of cars in strict correspondence with the volume of the railway's work by attending to an elimination of superfluous cars and detailing them into the general reserve or the divisional reserves of cars, and, lastly by keeping a record of the demurrage of cars in trains at depot stations (divisional points).

The results of the railway's activity in this direction very soon led to a decrease in the efficient time and a corresponding increase in the daily run of a working car, which may be seen from the following comparative table:

	1923	1924	1925	1926
Efficient time of working car ...	6.6	5.7	4.8	4.0
Daily run	62.7	71.2	82.5	90.7

Commercial speed.—The commercial speed in the past few years is shown in the following table:

1923	1924	1925	1926
14.6	14.6	15.4	14.8

The sharp increase in the volume of the traffic with its, particular bearing upon the Western and Southern lines of the railway, where the carrying capacity of the line was utilized in full, naturally caused a drop in the commercial speed. Nevertheless, this reduction was very insignificant in 1926 owing to a number of steps taken to regulate the running of trains and to reduce their stops at intermediate stations.

Measures in respect of the safety of traffic, referring to the technical operation.

In the past year a centralized and electric block system of switches and semaphores was installed at certain stations of the railway in order to provide for more safety of traffic.

Besides, the following steps were taken in respect to the technical operation of traffic.

With a view better to utilized locomotives is connection with the development and extension of sidings at stations and junctions the normal make-up of freight trains of 200 axles in respect of their length was established and announced to the railway according to regulations approved by the Board of Directors.

To accelerate the passing of trains through the stations on the Western and Southern lines experimental despatching of passenger trains at points of crossing with other passenger or freight trains was put into effect by delivery of rods without any passing of the latter through the apparatus, and in order to reduce the delay of trains at stations a regulation was issued fixing the exact whereabouts of the chief conductor in the train to enable the station master on duty to hand him the certificate regarding the delivery of the rod to the engine driver.

To accelerate the weighing of cars at certain stations special scales for cars of the "Tandem" system were erected making it possible to weight the cars in motion.

Besides, to avoid an agglomeration of cars with bulky goods particularly timber material, special transportable car scales of the "Boetticher" system were purchased and despatched to certain timber loading stations. These scales permit of the weighing of loaded cars by wheels.

Passenger traffic.—As regards passenger traffic it should be noted in the first place that the past year was distinguished by particular intensity of the transportation of passengers. Consequently, it became necessary to appoint a third pair of passenger trains on the Southern line from September, 1926.

For the same reason the run of passenger trains in the local traffic on the main line was also extended (trains Nos. 23 and 24 to Tsitsihar and trains Nos. 25 and 26 to Shihtowhotze).

The rational structure of the time table caused an economy in passenger car-axle-versts.

As will be shown below, the results of the passenger traffic in the past year were quite satisfactory.

Possessing a park of 158 four-axle passenger coaches and 439 two-axle coaches (including in this number baggage, dining, mail, sanitary and service coaches), the respective work of the railway is shown in the following table:

	1925	1926
Passenger car-axle-versts effected (thousands)	56,426	60,621
Passengers carried: paid passenger-versts (thousands)	321,010	388,106
Military passenger-versts (thousands)	41,976	35,000
Convicts and their guards passenger-versts (thousands)	456	210

Therefore, from a comparison of the past two years it appears that in spite of the insignificant increase in 1926 of the number of car-axle-versts used (7 per cent.), the number of paid passenger versts was by 20 per cent. higher than in 1925.

Commercial Activity

The above given data give a more or less exhaustive and complete picture of the work and activity of the principal technical departments of the Chinese Eastern Railway, the main object of which is to perform the work assigned to them in a most economic and efficient way by continuously introducing improvements and betterments purporting to reduce the general operating expenses of the railway.

The commercial work of the railway holds quite a unique position, being directed toward an increase in the freight turnover (the quantity of goods carried) of the railway, the attraction and canvassing of new goods to be hauled, the attachment to the railway of those handled previously, the regulating of the fundamental currents of freight traffic by routes and assisting the development of the local productive forces.

The extremely complicated economic situation in North Manchuria makes it necessary to dwell upon certain peculiarities in local activities, in order to give a clearer picture of the commercial work of the Chinese Eastern Railway.

North Manchuria is a typical agricultural country, with comparatively undeveloped industries. Consequently, the exporting and importing activity of the Chinese Eastern Railway is of foremost importance both for the railway itself and for the country as well.

Lacking direct access to the sea, the Chinese Eastern Railway, because of its geographical position, naturally is dependent

The Tsitsihar Station

to a certain extent upon its neighbors—the Ussuri Railway in the East, with the port of Vladivostok, on the South—the South Manchuria Railway opening the route to Dairen (Dalny) and on the West—the Transbaikal Railway.

The western route is of no particular importance at the present time because of the small commerce between the U. S. S. R. and China. The principal part is played by the eastern and southern directions, which are competing for the conquest of North Manchuria exports.

Owing to these particular reasons the Chinese Eastern Railway, as a commercial enterprise, is placed into quite special working conditions which should always be taken into consideration in a study of its operation and achievements.

The past year of 1926 was economically very favorable for North Manchiria. It was marked by bumper crops of the principal local cereals (soya beans, kaoliang, corn and Chinese native millet) which, naturally, in the first place had a bearing upon the work of the railway by increasing the quantity of goods carried in all directions and in every traffic.

The commercial transportation in 1926 by far exceeded that of any preceding years and reached the record figure of 256 million poods, being in excess of 50 million poods over the previous record of 1925.

The growth in the number of commercial goods carried by the railway in the course of the past five years, may be observed from the following table:

	Total carried Millions poods	Increase Millions poods	%
1922	151.5	—	—
1923	171.1	19.6	12.9
1924	184.7	13.6	8.0
1925	206.7	22.0	11.9
1926	255.0	49.3	23.8

The above table shows that the normal increase in the transportation of goods amounted to an average of about 11 per cent., and that in 1926 it leaped to more than twice this figure, in spite of the fact that the preceding year of 1925 was considered extremely propitious in the existence of the railway.

The first place in the goods handled by the railway, was taken, as usual, by cereals, the transportation of which amounted to 174 million poods, or about 70 per cent. of the total turnover, and showed an increase or 34 million poods over 1925; the second place was held by timber construction materials and fire wood—21.0 million poods against 19.5 million poods in 1925. These are followed by coal—19.7 million poods against 14.7 million poods in 1925. Among other goods import commodities are conspicuous, particularly articles for native Chinese consumption.

As regards timber materials, it should be remarked that in 1926 a very marked change occurred in their nature. The transportation of building timber fell by almost 2 million poods and was replaced by the transportation of fire wood for the requirements of the local market, which is explained by the decline in demand for timber in South Manchuria which began in 1925 in connection with the stopping of the building boom in Japan, which absorbed almost all of the Korean and Manchurian timber.

The distribution of goods by directions and categories of traffic maintained its former ratio (in millions of poods):

	1922	1923	1924	1925	1925
Exports ..	97.4	111.3	120.1	143.1	165.6
Imports ..	23.8	28.0	30.7	30.0	35.7
Local traffic	291.	30.5	33.1	33.0	54.7

The export goods carried, representing about 65 per cent. of the total quantity of goods handled, continued as heretofore to determine both the general welfare of the country and the railway and were the principal basis of their economic activity. The imports were in direct dependence upon them, because a good crop increased the purchasing capacity of the population and, consequently, the demand for manufactured products increased in the same manner; such products, it is known, are brought into North Manchuria almost exclusively from outside countries.

The unprecedented growth, in 1926, of local traffic transportation over the Chinese Eastern Railway, may be sub-divided into the carriage of cereals, coal, fire wood and building materials, the causes for this increase being explained at the detailed study of the local traffic problem.

Exports

Over 90 per cent. of the entire exports consist of cereals and bean oil, whereby the following five principal categories should be noted: beans, bean cake, wheat, wheat flour and bean oil, for the transportation of which a serious fight was fought between the neighbor railways until in 1925 a special agreement was entered into whereby upon the termination of the grain exporting season a final settlement of accounts is effected between the Ussuri and the South Manchuria Railway in respect of the transportation of export goods of the Chinese Eastern Railway, 45 per cent. of which being assigned to the Ussuri Railway and 55 per cent. to the South Manchuria Chinese Railway. Should, however, as a matter of fact, the actual transportation in one of the two routes, have exceeded the established ratio, then the railway concerned will have to pay to the other contracting party an amount corresponding to the respective cost of the transportation of such goods.

The Chinese Eastern Railway, on its part, undertook all necessary measures toward an equal distribution of the freight currents maintaining the established ratio. Thus, in November, 1924, when the Japanese steamship companies reduced their freight rates from Dairen to Kobe for bean cake, thereby causing these goods to turn abruptly to the southern route, the Chinese Eastern Railway raised its tariff for the Southern route and thus re-established the former position. The results of all such measures in 1926 were quite satisfactory, which may be seen from the following comparative table for the past five years (in millions of Roubles):

EXPORTED OVER THE EASTERN ROUTE:

	1922	1923	1924	1925	1926
Beans	22.1	23.4	34.3	32.1	35.2
Bean cake	9.8	15.6	7.8	11.1	25.2
Bean oil..	0.8	1.1	2.0	1.9	2.4
Wheat	2.0	1.9	0.4	0.8	—
Bran	0.2	0.4	0.3	0.2	0.3
Other cereals	1.5	0.5	0.8	2.3	9.6
Total	36.4	42.9	45.6	48.4	72.7

EXPORTED OVER THE SOUTHERN ROUTE:

	1922	1923	1924	1925	1926
Beans	31.9	36.6	35.0	52.3	59.2
Bean cake	2.9	2.7	16.7	11.0	0.9
Bean oil..	0.2	0.3	—	0.1	—
Wheat	3.8	5.9	0.9	1.7	4.4
Flour	2.3	3.4	0.2	0.6	0.7
Bran	.13	1.9	0.8	0.8	0.9
Other cereals	4.5	3.5	3.0	14.8	17.9
Total	46.9	54.3	56.6	81.3	84.0

Comparing the above figures, we see that 1926 was an exceptionally favorable year for the eastern route: the increase in grain exports compared to that of 1925 almost entirely fell to the Ussuri railway; for this reason the export ratio, which had dropped to 37 per cent. for the Ussuri Railway in 1925, reached 46 per cent. for the Ussuri Railway in 1926, having exceeded all preceding years.

It is of interest to note that this increase is almost entirely due to the products manufactured from beans, and "uncovenanted cereals" among which a prominent place is held by kaoliang, the transportation of which increased from 1.1 million poods to 5.8 million poods, an important part in these consignments being held by the direct shipment of kaoliang from North Manchuria to Shanghai *via* Vladivostok, effected through the newly opened Commercial Agencies of the Chinese Eastern Railway, these shipments being the first of their kind ever made. Another consequence of this step was an enlargement of the selling market for local cereals, North Manchurian Exports penetrating to Shanghai for the first time.

Unmanufactured beans were carried mainly southward as heretofore because in the first place they are attracted that way by the Dairen oil mills and in the second place by the Dairen Grain Exchange, which has a foremost importance in the commercial activity of both North and South Manchuria.

The transportation of wheat flour, wheat and bran also grew to a certain extent; however, the fact that it was of greater advantage to cultivate local native cereals (particularly Soya beans) and the bad crops of wheat in the past two years considerably reduced the area under wheat cultivation, whereas the competition

of Canadian and American wheat on the outside markets almost reduced to naught the exporting activity of the local mill owners.

Simultaneously the exports of all other kinds of cereals showed a very marked improvement, *i.e.*, of such cereals, which in the annual reports are listed as "other cereals." In the past two years and particularly in 1926 these "other" cereals occupied an important place in the general volume of freight handled by the Chinese Eastern Railway in both directions and one may expect that certainly these shipments will grow from year to year.

The exports of timber material declined from 10.8 million poods to 8 millions owing to reasons already expounded above, whereby all this reduction is charged entirely to southern exports, exports to the east even showing a certain increase in connection with the growing demand for softwood (pine and fir) logs on the part of Japanese paper mills.

Other export consignments consisted of products of animal industries; their quantities were insignificant.

Imports

The import transportation is placed into quite different conditions. Even in pre-war years, when almost the entire exports (over 90 per cent.) were shipped *via* Egersheld, and the importation of goods of Russian origin brought in from the east and west had a very great importance in the life of North Manchuria, yet the bulk of import goods was consigned from the south.

This is explained principally by the fact that the main consumer of such goods—the Chinese farmer—has a demand for specific goods of Chinese manufacture, which are all classed under the one denomination of "Tsa Ho."

The principal centers for the production and sale of these products are located in China and in part in South Manchuria, consequently they gravitate toward the South Manchuria Railway.

Through Vladivostok are consigned mainly goods of European, particularly Russian, origin.

In the period between 1917 and 1923 the import activity of the port of Vladivostok came to a complete standstill, and only the imports of Suchan coal and fishery products amounting to less than 2,000,000 poods penetrated into Northern Manchuria from the east.

The Chinese Eastern Railway being interested in the loading of its cars, which return as empties after having carried eastward export consignments, is taking energetic measures to stimulate the inflow of import goods from the Ussuri Railway, with the full assistance of the latter, and the result was obtained that imports from the east gradually begin to increase; during the past five years they have quadrupled.

Import shipments are distributed by directions as follows (in millions of poods):

	1922	1923	1924	1925	1926
From the south ..	21.6	24.6	25.8	26.0	31.0
„ „ east ..	1.3	0.3	2.0	3.1	4.7
Total	22.9	24.9	27.8	29.1	35.7

The principal import goods are: coal—11.5 mill. poods, salt—4.3 mill. poods, gunny bags for cereals— 2.0 mill. poods, piece goods—1.6 mill. poods, mineral oils—1.5 mill. poods and fruits—1.4 mill. poods.

Leaving aside the transportation of coal and salt, as cheap bulky goods, we shall obtain a clearer picture of the *imports* into Northern Manchuria of regular import articles (in millions of poods):

IMPORTED:

	Coal		Salt		Other goods	
	From Uss. Rly.	From S. M. Rly.	From Uss. Rly.	From S. M. Rly.	From Uss. Rly.	From S. M. R.
1923 ..	0.9	11.4	—	3.2	0.4	10.0
1924 ..	1.3	10.6	—	3.2	0.7	13.0
1925 ..	1.9	9.7	—	3.9	1.2	12.4
1926 ..	2.6	8.9	—	4.3	2.1	17.8

As regards the imports of coal it should be noted that in spite of the general increase in goods transported the arrivals of imported coal have declined to a certain extent, the reduction falling entirely to the Fushun coal. The arrivals of Suchan coal continue to grow both for the requirements of the private market and the Chinese Eastern Railway.

The transportation of salt is effected entirely over the Southern line, because the trade in salt is handled in China by the Government Salt Monopoly, and for the latter the nearest route is over the South Manchuria Railway and all the salt arriving in the area of the Chinese Eastern Railway is obtained at the salt works located on the shores of gulfs of Pechihli and Liaotung.

The development of the imports of other more valuable goods is interesting to follow.

The principle articles of imports *via* Vladivostok in 1926 were gunny bags (0.4 mill. poods) and Java sugar (0.4 mill. poods). these goods began to be shipped *via* Vladivostok in 1925, and therefore one may say that their shipment was due to recent measures taken by the railway, owing to which it became possible to regulate to a certain extent the imports of an extensive local consumption, which are brought into China by sea.

The imports of Soviet kerosene and benzine should also be noted. They made their appearance upon the Far Eastern markets after the war for the first time in 1924. At the present time their shipments exceed 200,000 poods and the Soviet kerosene is competing quite successfully with American and that of Sumatra, which formerly held the position of monopolists in Northern Manchuria.

Compared to pre-war days imports from the east have in 1926 reached the figure for 1913, namely 4.3 million poods; however in respect of the value of imported goods they have not yet quite reached the former level, because in pre-war years the imports of Suchan coal were very insignificant, salt, however, was shipped exclusively from the east.

Imports from the south are consigned either in the direct C. E.—S. M. through traffic or in the local traffic from Kwanchengtze station, being distributed as follows:

	1923	1924	1925	1926
From the South Manchuria Rly.	22.2	22.0	23.4	26.7
From Kwanchengtze station..	2.4	2.4	2.7	4.3

Consequently, the past year shows a particular increase in the shipments from Kwanchengtze station in the local traffic, which should be explained on the one hand by the drop in the rate of exchange of the local dollar, which considerably cheapened local consignments, the same being rated at the fixed ratio of one Gold Rouble=107 cents; on the other hand by the establishment of a special seasonal tariff for import goods, permitting the attraction of a large number of goods which prior to 1926 were shipped by cart from Changchun to the nearest district centers in the area of the Southern line of the Chinese Eastern Railway.

The goods handled by Manchouli station, which owing to the absence of through traffic arrangements, show the inter-exchange of commerce with Transbaikalia, are of no particular importance in 1926, being small in number, as the following table will show (in million of poods):

	1922	1923	1924	1925	1926
Arrived at Manchouli	5.5	1.5	0.8	1.1	2.0
Despatched from Manchouli ..	0.6	0.5	0.7	1.1	0.8

The comparatively larger shipments in 1922 are explained by the sending of grain to the U. S. S. R. for famine relief (3.8 mill. poods); in the following years shipments remained almost stable.

Among the goods arriving from the U. S. S. R. a certain change should be noted, namely that since the end of 1925 in addition to timber and coal, piece goods began to arrive, as well as tobacco products and mineral oils.

Local Traffic

The transportation of goods in the local traffic, which in the course of the past few years maintained a level of 33 million poods, showed a sharp increase in 1926 by jumping to 56.3 million poods, owing to a number of reasons, the principal of which were the following:

The growth in the bringing in of beans to the Harbin terminal stations, which was the result of a special tariff for the milling of beans by the Harbin bean oil mills, introduced with the purpose of strengthening and developing this principal branch of the local industry.

The development of the activity of local collieries, which are at present in a position to compete freely with imported coal—from Suchan (in the Maritime province) and Fushun (S. M. R.).

The latter phenomenon may have an even greater importance for the entire existence of the country, because until 1923 the prices

for coal were almost exclusively regulated by the Fushun product and owing to this fact the local industry, as well as to a certain extent the railway itself, were dependent upon the South Manchuria Railway, which is directly interested in the work of the Chinese Eastern Railway. In the period between 1923 and 1925 the increased imports of Suchan coal more or less had a regulating effect upon prices; however, in view of the great distance, this coal could not penetrate further than Harbin, and, consequently, it solved only in part the coal problem, as a whole. Upon the opening of the new coal mines at Muling on the Eastern line of the Chinese Eastern Railway and the rational working of the Chalainoerh mines (in the west), which since 1925 were operated by the new management of the Chinese Eastern Railway by its proper means, the Chinese Eastern Railway took up a strong attitude in the question of fuel supply, and in future may expect to become independent of imported coal altogether.

Therefore, the Chinese Eastern Railway applied all efforts toward the development of the carriage of local coal, establishing reduced tariffs for the benefit of the principal industrial centers, whereby the stations of the section from Harbin to Fularki had similar rates, equalizing thereby the operating conditions of the industrial enterprises and opening a wide field of activity to the enterprises on the Western line.

As a result of all these steps the transportation of local coal reached the figure recorded for Fushun coal, being distributed by despatching stations as follows (in millions of poods):

From stations	1923	1924	1925	1926
Manchouli	0.1	0.3	0.7	0.5
Chalainoerh	2.4	2.0	1.3	3.0
Sochingtze junction	—	—	0.9	4.2
Other stations	0.1	0.1	0.2	0.5
Total	2.6	2.4	3.1	8.2

Particular attention should also be drawn to the transportation of rice, which until 1923 was only imported from the South Manchuria Railway. The establishment of rice sowings in the area of the Eastern and Southern lines and the opening of rice cleaning mills prove that it is quite probable that in future North Manchuria will be a self-supplying country in respect of rice, and, indeed, upon the introduction of encouraging tariffs for the rice milling industry in the end of 1925, almost the entire imported rice was in the past year replaced by local rice, which can be seen from the following data regarding the transportation of rice (in thousands of poods):

	1924	1925	1926
From the S. M. R. and Kwanchengtze station	482	388	135
In local traffic	192	245	502
	674	633	637

Among other goods one could observe a large increase in the transportation of building materials and rails in connection with the construction of the Hu-hai Railway and the Harbin tramway, as well as an increase in the carriage of firewood (1926—6.9 mill. poods, 1925—3.6 mill. poods), in view of the very small quantity of wood arriving by river in Harbin during the navigation period of 1926, and because the entire tonnage of the Chinese river fleet was insufficient and engaged in the more advantageous transportation of farm produce from the Lower Sungari district.

Consequently, as regards the hauling of commercial goods, the year of 1926 must be considered extremely successful.

The passenger traffic, the development of which had been delayed by a number of outside reasons, in 1926 again began to proceed along a path of distinct improvement.

The carriage of passengers, by classes, as compared to foregoing years, showed the following figures (in thousands of individuals carried):

	I	II	III	IV	Total
1922	4	33	908	1,209	2,155
1923	4	24	776	1,563	2,367
1924	4	24	1,141	1,041	2,183
1925	5	24	1,317	1,110	2,454
1926	5	29	1,858	1,379	3,271

In addition to the general increase in the number of passengers carried, the relation between the different classes also was modified in a sense advantageous to the railway: the fourth class passengers, which is the normal class in the make-up of ordinary passenger trains on the Chinese Eastern Railway, having reached the maximum in 1923, very markedly dropped and their subsequent increase is much slower than that of the third class, which proves that we have here a transfer of passengers from a lower to a higher class.

For the first time since the pre-war days we also observe an increase in the number of passengers of the two higher classes, being the result of the inflow of people travelling from the south of China to Western Europe *via* the U. S. S. R. and *vice versa*.

In order to attract these passengers the Commercial Agencies of the railway have opened a preliminary booking service and sale of tickets for the railway of the U. S. S. R. and made an extensive advertising campaign for this traffic, acting in this respect under an agreement with the Transbaikal Railway.

Measures for an improvement of the work and living conditions of workmen and employees.

In terminating the review of the fundamental measures concerning the technical and commercial activity of the Chinese Eastern Railway in 1926, it is necessary to dwell upon the question of the improvement of the living conditions of employees and workmen of the railway.

The most important achievement in this connection was the increase in the minimum wages for daily workmen from 45-50 cents to 60 gold kop. which at the present rate of exchange equals almost one Chinese local dollar (one gold rouble=125—130 cents).

With a view to improving the living conditions of lower employees and workmen of the railway new dwellings were built for them, as well as a number of improvements introduced in the equipment of those existing. Wages and salaries were also raised.

Recently the Board of the railway has agreed in principle to reduce the working norm of locomotive and train crews from 336 to 240 hours per month, with the right to introduce this measure as soon as financially feasible. In part the local staff on the line has also been increased so as to replace the former two shifts by two and a half and even three.

Financial Operating Results

The general increase in the number of commercial goods and passengers carried, which has been surveyed in another part of this article, is the reason for the increase in operating revenue, which by far exceeded the original expections.

The general structure of the operating budget of the Chinese Eastern Railway was as follows (millions of roubles):

Revenue from	1922	1923	1924	1925	1926
Transportation of goods	25.3	26.0	27.2	33.2	38.8
Ditto from passengers	8.6	8.4	7.6	7.9	8.8
Total revenue depending upon traffic	33.9	34.4	34.8	41.8	47.6
Revenue from other operations	3.5	1.7	2.8	4.6	5.0
Grand Total	37.4	36.1	37.6	46.4	52.6

On the other hand, the different achievements and improvements of the technical departments of the railway made it possible to reduce the expenses falling to unit to the work performed, and, consequently, in spite of the increased building activity and the raising of wages and salaries the general expenditure of the railway followed in proportion to the increase in the gross and net revenue. Therefore the operating ratio of 1925, which was the best in the railways existence, remained without any change.

General data regarding the relation between revenue and expenses of the railway operation are given in the following table:

Millions of Roubles:

	Gross revenue	Expenditure	Net profit	%% to gross revenue
1922	37.4	26.3	11.1	30
1923	36.1	24.3	11.8	33
1924	37.6	21.9	15.7	42
1925	46.4	24.1	22.3	48
1926	52.6	27.6	25.0	48

The favorable operating results of the railway permitted the undertaking of a number of necessary works and the appropriation for these amounted to 5.9 million roubles. Besides, the loss charged to the special enterprises of the railway (Administration of the concession zone, upkeep of military railway guards, etc.), amounted to 3.3 million roubles and, therefore, the final net profit of the railway in 1926 was equal to 15.8 million gold roubles.

Liu Chang Coal Mining & Railroad Co.—A total profit of $110,000.949 was realized for the year ended March, 1927, by the Liu Chang Coal Mining & Railroad Company, B154 Sinza Road, Shanghai. From this an amount of $80,000 was deducted as fines imposed by the Tung Chuen Chu, leaving $30,000.949 as the toal net profit for the year. The company is capitalized at $1,440,000 at $100 per share. The general manager is Li Shu-chen and the manager Tu Chia-k'un.

Kiao Tsi Bridge.—The new bridge at Km. 14 of the Kiao-Tsi Ry. spanning the Li-Tsun-Ho was opened to traffic on May 25th. The bridge is 7 x 30 m. of Deck Plate Girder type. The steel was fabricated in Germany and purchased through G. Borkowetz and Carlowitz & Co. In order to maintain the same area of waterway the bridge was raised two meters. The total weight of steel is 525 tons and the total cost for all items was $170,000 of which 24 per cent. was for earthwork, temporary trestle and siding. The erection was by the Yu-Ching Company of Shanghai.

Fushun Oil Shale Industry.—Referring again to the Fushun Oil Shale industry, Rear-Adm. Makino now in the temporary service of the S.M.R. Co., who went up to Tokyo towards the end of last month, wired back to the S.M.R. Co. General Offices a few days ago of the approval by the Navy people as quite reasonable of the business prospectus with estimates, as prepared by the Railway Co. for starting the industry.

This has completed the understanding with the Navy Office concerning the launching of the new venture.

The Railway Co. is now drafting a formal application to be presented to the Central Government for Official approval and will be ready to submit it to Kwantung Government in a day or two. Kwantung Government being well acquainted with details of the plan, appreciative of its true merit, the same application will be forwarded to the Colonial Board, Tokyo, without delay. Then, on the part of the Central Government, the theme being quite familiar to the dignitaries concerned, perhaps excepting the new Cabinet Ministers, its sanction seems likely to be forthcoming also quite readily.

Thus, the starting of this industry has become a moral certainty in the very near future.

As to necessary outlay, it will be presented to Government as Supplementary Budget to the current fiscal year's for the approval of the Finance Ministry on securing the Government sanction for the enterprise plan itself.

In passing, Rear-Adm. Makino is due back at Dairen by tomorrow's steamer from Japan.

Shale Oil Plant Plans Approved.—Plans for the construction of a shale oil refining plant at its Fushun Colliery have been approved by the South Manchuria Railway Company, together with estimates for construction and maintenance.

According to the plans, the refinery will treat 2,000 tons of shale a day, or 680,000 tons a year. The plant will cost Y.5,000,000 to build and will turn out 25,000 tons of shale oil, in addition to 7,000 tons of paraffin and 23,000 tons of coke. The scheme was drafted by the dry distillation committee and approved by the company's directors. It has received the approval of the Government units concerned and now awaits the final sanction of the Cabinet.

If construction is commenced in the near future, the work should be done by 1930. It is assumed that work or the foundations will commence in July.

The company feels quite certain of the success of the enterprise, even without the Government guarantee. A contract is to be signed with the naval authorities who have agreed to take over the entire output.

Dr. T. Kimura of the Colliery Technical Institute, who has been engaged in experiments for extracting paraffin from the Fushun oil shale and for extracting oil, reports complete success. By following his process the work will be greatly simplified and the complex machinery once thought necessary will be eliminated. Moreover, a higher percentage of paraffin will be obtained.

Under Dr. Kimura's system, if the new plant is designed to handle 2,000 tons of shale a day, the annual income will be Y.800,000. The scientist also is studying the extraction of sulphate of ammonia from shale oil and reports progress.

Railway Surtax on Shanghai-Hangchow Line.—The 5 per cent. surtax on freight and passenger fare collected on the Shanghai-Hangchow-Ningpo Railway by former Chekiang officials is once more enforced. The proceeds, estimated at about $200,000 a year, are to be set aside for railway improvement.

Merger Plans Proceed.—The rumored merger of the Tokyo Electric Light Company and Tokyo Electric Power Company is going to take tangible shape. Mr. Y. Matsunaga, vice-president of the latter company, has had frequent interviews with Baron Seinosuke Goh, chairman of the board of directors of the former institution. Opinions were exchanged between the two chiefs on the status of these companies. The Tokyo Electric Light has decided to establish an investigation department shortly in connection with the investigation of the other's assets and liabilities. This investigation is expected to take about two months. The Tokyo Electric Power also is to conduct a technical investigation on the other's business status. These companies ayre likely to ask Mr. Seihin Ikeda, senior managing-director of the Mitsui Bank, to appraise their properties and set ratios for stock transfer. Mr. Matsunaga is likely to join the directorate of the Tokyo Electric Light Company upon the merger.

Crystal Mining at Laoshan, Tsingtao.—The bulk of the rock crystal consumed in the optical glass making industry in China is produced at Laoshan, near Tsingtao. Commercially, crystal is divided into three classes by Chinese optical glass makers, the classification being based upon the color. What is called "ink crystal" is the dark colored variety, the "tea crystal" is of dark brownish shade, resembling the color of the red or black tea, and the "water crystal" is colorless. Crystal mining at Laoshan dates back a century or so ago. The industry is almost monopolized by a certain clan living near the place. The members of the clan, who are farmers, mine crystal as a slack season occupation, and are so experienced that they can accurately locate the mines underground by merely examining the indications on the surface soil. Every winter these men wander about the countryside prospecting for crystal deposits. Whenever they come across some small particles of crystal or partially crystalized quartz, they mark the spot and approach the owner of the land for a mining right. It is customary for the owner of the land to claim half of the gross profits realized from such mining operations. The crystal quarried is usually sold to the Tsingtao optical glass makers and the proceeds divided equally between the miner and the land owner.

Crystal quarried from the mines varies greatly in size. Sometimes a piece weighs over 40 or 50 catties. The average yearly output from the Laoshan mines is about 7,000 or 8,000 catties of "water crystal" and 3,000 or 4,000 catties of the other varieties, the colored varieties being far more valuable than the "water crystal." A mine is sometimes operated by a gang of 30 to 50 men hired by the miner, and the work is always completed in one or two days. The crystal is sold to the Chinese optical glass makers at Tsingtao by weight, at a price varying from $1 to over $100 per catty according to the kind and quality of the article. There are two optical glass makers in Tsingtao. the Pao Ming Optical Glass Manufacturing Company and the San Shan Cheng Optical Glass Manufacturing Company, engaged in making optical glasses exclusively from rock crystal. But in order to obtain the highest price for the best crystal, the miners often bring the first grade specimens to Peking or Soochow and dispose of them to optical glass makers and curio dealers who can afford to pay more. Quite a number of crystal miners at Laoshan have amassed moderate fortunes through their mining operations. Formerly they used to export the crystal as far as Urga, in Outer Mongolia, where they could sell it at a far higher profit than elsewhere, but the offers of the Peking and Soochow curio dealers and optical glass makers are usually liberal enough to satisfy their expectations.

The Chinese optical glass makers of the old school make eye glasses exclusively from rock crystal. The broad horned-rimmed spectacles worn by Chinese gentlemen of the old generation are produced by this class of manufacturers. Glasses made of colored crystal are far more valuable than those from the colorless variety because of the popular belief that glasses made of "ink" or "tea" crystal can absorb those sun rays harmful to the eyes. A pair of first grade colored crystal glasses are sometimes quoted at $100 by the Tsingtao makers.

Japan "Buys British."—Messrs. C. A. Vandervell & Co., Ltd., have recently been successful in obtaining large contracts for the C.A.V. Tom Tit model, Loud Speakers in Japan.

Osaka-Kobe Rail Line Gets Y.15,000,000 Loan.—The Hanshin, a Osaka-Kobe, Rapid Transit Electric Railway Company has concluded negotiations with the Mitsui, Yanmaguchi, and Fujimoto banks and Sumitomo and Kashima trust companies for borrowing Y.15,000,000 at an annual interest rate of 7 per cent. Part of this loan will be devoted to the conversion of old loan and part to the business extension.

Water Works for Kirin City.—Kirin authorities are setting up a water works for the capital city. A preparatory office to carry out various constructive measures has been orgainzed. According to the plans and specifications of the works, there will be a tank, a filtration bed, a power station and a new building of 17 rooms for the management. The water will be obtained from the Sungari River which flows by the city. The contracts for building the houses, the tank and the filtration bed have been awarded to several firms in Tientsin and Peking while Messrs. Carlowitz & Co., and Siemens China Co. will supply the mains, which will cover a total length of nearly 30,000 meters.

Tokyo Light Wants Loans Adjustment.—Mr. Shohachi Wakao, president of the Tokyo Electric Light Company, accompanied by Mr. Kengo Mori, its financial adviser, are expected to visit America and Europe in connection with the conversion and raising of loans for the firm. The electric light company has announced a program readjustment and improvement of its business system which includes the conversion of old loans raised in America at high rates for new loans in England.

The new policy also involves measures for raising the value of its stock, now quoted at a little less than its paid up price of Y.50, by means of improvement in its business system. A third reform policy of the company is an extensive merger plan involving such other large power companies as the Toho Electric Power, Daido Electric Power, Ujigawa Electric Power and Nippon Electric Power interests. The merger with the Tokyo Electric Power Company is likely to take place first under present circumstances.

Baldwin's Shipping Locomotives.—Industrial Philadelphia is still doing business with China, despite the warfare now being engaged in there by various factions. This week there will clear from the port of Philadelphia the steamship City of Johannesburg bound for Dalny, which is located in Northern China, and which has been comparatively free of the strife prevaling in other sections of the country.

The City of Johannesburg will have aboard four Mogul type locomotives, built by the Baldwin Locomotive Works for the Mukden and Hailung Railway.

Weighing with tenders, 160,000 pounds each, or approximately 286 tons, the Philadelphia-built locomotives will be placed aboard the ship at the Baldwin Eddystone plant beginning late Thursday afternoon or early Friday morning. The shipment will be made in what the builders term a "knocked-down" condition, various parts being crated. When the shipment reaches China the locomotives will be assembled for duty by a representative of the Baldwin concern.

Prior to the outbreak of the World War, China was one of Baldwin's most important customers, but the locomotive market, like markets generally, not only in China, but in virtually all the countries on the other side of the Atlantic and Pacific Oceans, were hard hit. Of late years, however, the Chinese market has been improving somewhat, and prior to this week's coming shipment, twenty locomotives have been built for Chinese railroads by the Baldwin works.

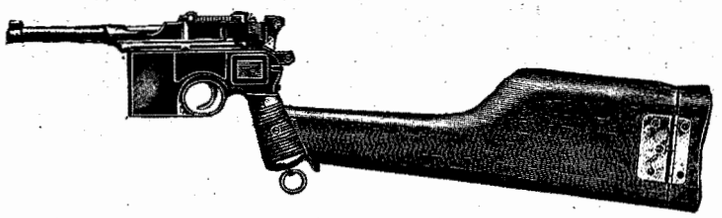
"We are sending locomotives to China all the time, said" Samuel M. Vauclain, president of Baldwin's yesterday, in discussing the scheduled arrival of the City of Johannesburg, due to reach Eddystone Thursday.

He added that the business was on a cash basis; that very little credit is being extended to China at present by Philadelphia concerns, and that what there is is on a short term basis.

Changchow-Amoy Railway.—The Changchow-Amoy Railway, about 56 *li* in length, used to be leased to private persons for operation, but Fukien authorities recently had the line once more placed under Government control by appointing Wu Tung-wen as director. The new director has asked the authorities for funds to make the necessary improvements and replacements for depreciated rolling stock.

Express Lift Co. in Singapore—A contract, approximate value $150,000,—has been placed for British lifts by the Public Works Department, Singapore, with the Express Lift Co., Ltd. London for twelve Passenger Express Lifts fitted with Automatic Floor Levelling Devices to be installed in the New General Post Office in Singapore, also one Express Goods lift for the same building. A large number of Express Lifts are installed in various parts of China including four in the new Chinese Post Office, Shanghai.

AGENTS WANTED



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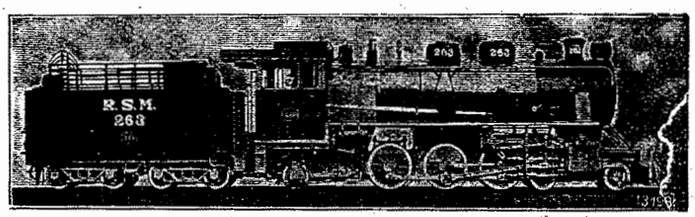

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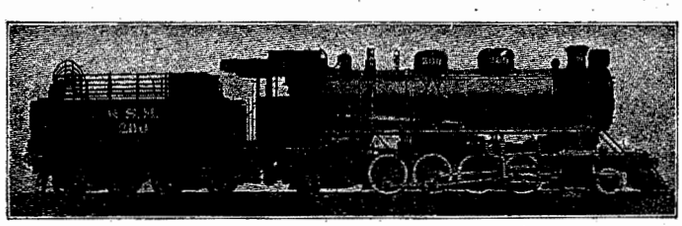

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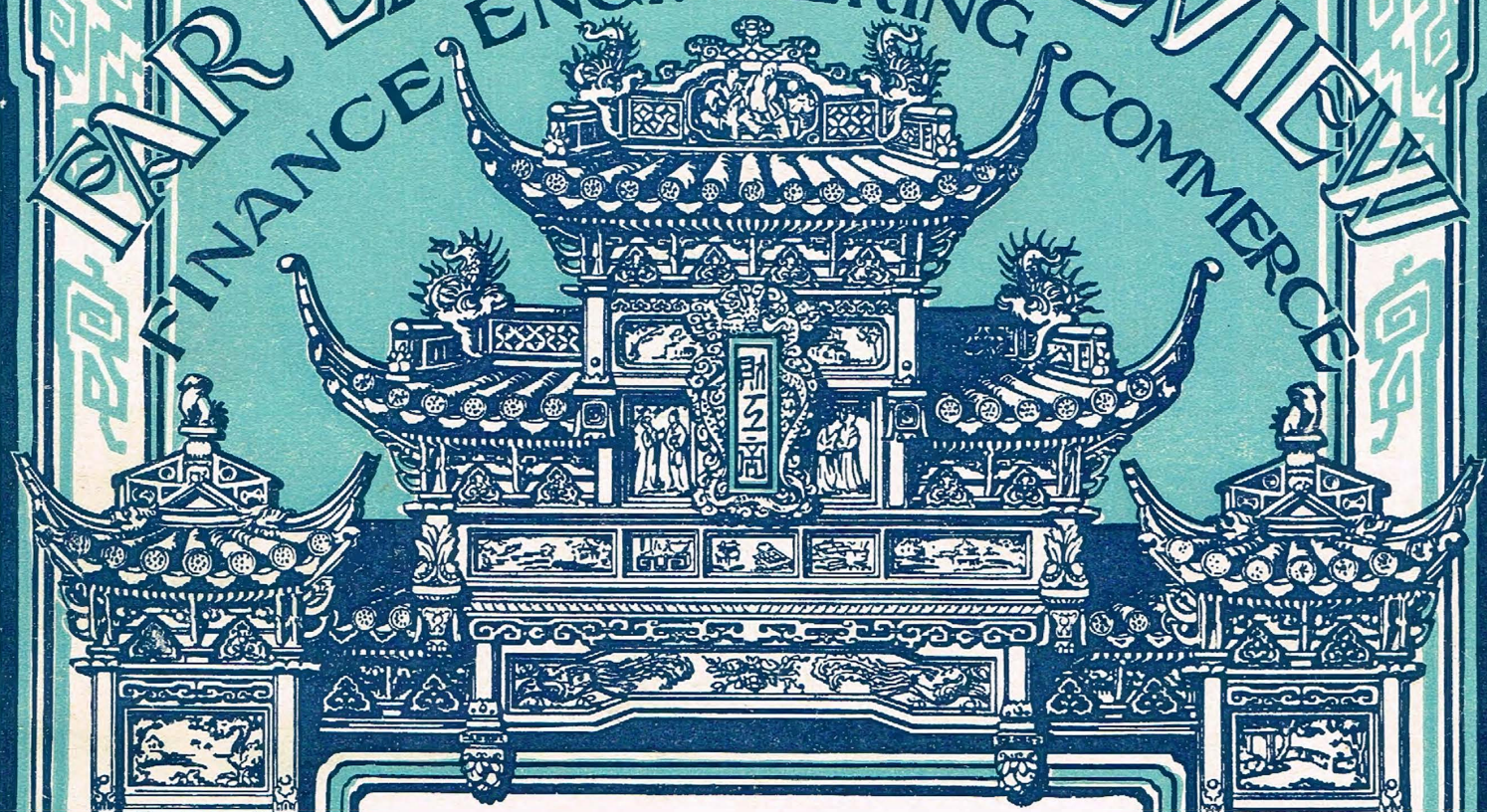

THE DEVELOPMENT OF MANCHURIA

Interviews with President Yamamoto and Vice-President Matsuoka

THE FUTURE OF THE PHILIPPINES

IS SHANGHAI OUTGROWING ITSELF?

CHINA'S FUTURE MOTORCAR CIVILIZATION

AMERICAN GOVERNMENT UPHOLDS THE TREATIES

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遠東時報

sides to use the utmost endeavor to see that they are executed according to their full tenor."

The result of Commissioner Lurton's decision was the immediate cancellation of shipping contracts on American ships on the Pacific. The importers in Shanghai and South China felt that their goods would be better protected if carried in British and Japanese ships and if deposited in British and Japanese warehouses. It appeared for a moment that the American Government had recognized the right of the Nanking Government to invalidate the treaties and to act independently of all treaty provisions. There was great rejoicing among certain elements of the Chinese, who think only in terms of diplomatic victories and who have no prescience in viewing their country's future. The denationalized Americans, who are thinning in number in China, were also full of tremendous enthusiasm. The American Government would kill American shipping on the Pacific to prove its willingness to permit a Government of a part of China to violate a treaty between the United States and China, they believed.

Then came the definite decision of the American Government to enforce the treaties. That decision was as clear-cut, as certain, as positive as any step which any nation has so far taken. It permits the release of American goods upon the payment of the five per cent. treaty duty only, whenever any Government of China imposes a higher duty without first negotiating a new treaty. It does not concern itself about the two and a half per cent. surtax which the British have recognized but which the United States ignores because it is not provided for by treaty arrangements. In a word, the American Government, which fully sympathizes with China's ambition for treaty revision, stands by the present treaty, until there is revision in some orderly, representative manner. The official notice with regard to this question is herewith given.

AMERICAN CONSULATE-GENERAL,
Shanghai, China, October 3, 1927.

Subject: Duty on Imports.

CHAIRMAN, AMERICAN CHAMBER OF COMMERCE,
3 Canton Road, Shanghai.

SIR.—Reference is made to the letter of September 9, 1927, from the Secretary of the Chamber of Commerce inquiring whether American merchants can clear cargo by depositing with the American Consul-General the treaty duty and the two (two and a half per cent.) surtaxes and to my reply of September 13th stating that the Department of State had instructed the Consulate-General on August 1st that it could not become the depository for Customs revenues in the manner suggested by you.

I now take pleasure in advising you that I have been authorized by the Department of State and am prepared to accept deposit of the treaty duty, wharfage and conservancy dues on consignments of wines and liqueurs subject to the special thirty per cent. stamp tax and on consignments of tobacco products subject to the fifty per cent. tobacco products tax, and to inform American warehousemen that there is no objection to their releasing such cargo.

The conditions under which this will be carried out will be made known to you and interested firms not later than the fifth instant. Suffice it to say that the request for the release will be made upon the payment of treaty duties only.

Very respectfully yours,

(Signed) EDWIN S. CUNNINGHAM,
American Consul-General.

The Development of Manchuria

THE interviews which we publish in this issue of the "Far Eastern Review" with Mr. Yamamoto, President of the South Manchuria Railway and Mr. Matsuoka, Vice-President, give a very definite idea of the purposes and plans of the new administration of this most important artery of communications in Manchuria.

What they do not state in their interviews, but what is so clearly to be noted in the entire orientation of Japanese policy, is that there are two aims which the Japanese have in that country: (1.) is clearly the economic development of Manchuria as a trading proposition, as a source for raw materials for Japan and as a prosperous part of China in which Japanese can live and trade. There are no political motives associated with this ideal. It is as genuine as was the British desire to develop an economic mart in the Yangtze, without political associations. (2.) The second Japanese motive has, however, some political connotations. For, Japan is very definitely faced with the probabilities of a Russian imperialistic movement in China, which has for its principal purpose an onslaught upon Japan, with the ultimate object of reducing Japan to a secondary power.

This second factor easily becomes the more serious one, for the very life of Japan is dependent upon peace in Manchuria. There has been too much talk in connection with the Russians about Communism and Bolshevism. These European political terms have little to do with the situation in Manchuria. Russia is not seeking to turn Manchuria Communistic. Russia is seeking, however, to prepare Manchuria as a battlefield in her eventual war with Japan. And that is a very serious matter, for it is not possible that Russia can attack Japan in Manchuria without involving all the principal Powers, including the United States in another world war. It is for that reason that everything about Manchuria takes on such immediate importance. It is the probable scene of the next great international conflict and the two or three silly Americans, who are suffering from a Japanophobia and therefore are supporting the Soviet attitude in China, do not altogether realize what they are about. They support Soviet Russia because they hate Great Britain and Japan and they hate Great Britain and Japan because these Empires are large and peaceful and successful. They prefer the madness of Russia because it appeals to their sense of helping the under dog, but Russia need not have been an under dog were it not for her own contrariness in attempting to disturb everything that is sound and constructive the world over.

Manchuria is economically the most modernly and intensively developed region of China. In Manchuria there are more railways than in the rest of China put together, more in number and in mileage. In Manchuria there are more good roads than in the rest of China. The whole of Manchuria is tied together by a system of long distance telephones, which one does not find elsewhere in China. Not all of this has been done by Japan, but Japan has played a pre-eminent part in the economic development of the country and in indicating to the Chinese a path toward modernity. This is constructive work of an order which deserves the gratitide of the Chinese people, who after all, are the principal beneficiaries. That they will be grateful at the crucial moment is a foregone conclusion, for every indication, political and social, points to the closest co-operation between Chinese and Japanese.

President Yamamoto on Manchuria

CO-OPERATION between Japan and China in the development of Manchuria, cessation of the obstacles offered by the Chinese to Japanese legitimate efforts in Manchuria, and, in some instances, to the very presence of Japanese there; and, generally, the bringing about of greater regard on the part of the Chinese for Japanese rights there; these factors form the "positive policy" of Japan in Manchuria, exaggerated fears of which have caused objections to arise in some quarters, says Mr. J. Yamamoto, who recently took over his duties as President of the South Manchuria Railway Company, the principal instrument of Japan's interests

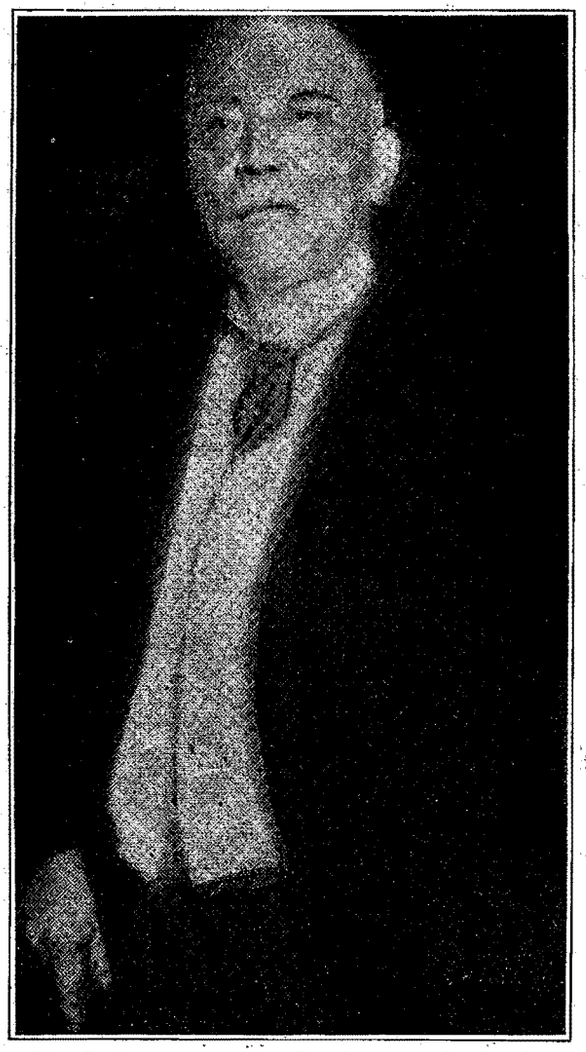
in Manchuria. There is nothing new about all this, no thought of aggression. On the contrary, the keynote of this policy is the eradication of such opposition and working at cross-purposes as has developed during recent years so that the peaceful and prosperous advancement of Manchuria may be hastened to the advantage of all concerned.

"Manchuria has prospered largely through Japanese efforts," says Mr. Yamamoto. "Japan came to Manchuria when she preserved these provinces for the Chinese. She has the right to remain by virtue of the treaties following the Russo-Japanese war. She has justified her presence by the development which she has brought about.

"It is true, of course, that Japan has served her own interests, also. Thus she has in Manchuria her first line of defence. She does not want war in fact, she is eager to preserve peace—but strategical reasons form one benefit which she derives from her presence in Manchuria. Japan has also gained from the great agricultural and industrial development of these provinces, but the Chinese have been the principal gainers therefrom. When one considers the direct debits and credits of this situation, counting in the expense which Japan incurs in maintaining the Kwantung Government and her military and police establishments, it will be found that Japan spends there annually ten million yen over and above her gains. Furthermore, it must be remembered that practically all the earnings which Japan makes in Manchuria are not taken away, but are put back into the country. So while it is true that in a broader, indirect way, Japan gains from her presence in Manchuria by drawing thereon as a source of raw materials and by utilizing it as a market for her manufactures, the direct gain is practically all Chinese.

"The so-called 'positive policy' of Japan contains nothing new or startling. It is ridiculous to refer to it as a sort of new 'Twenty-one Demands.' Its purpose is simply to follow the same broad lines as I have stated. It is just the contrary to aggression, as its principal purpose is to remove causes for friction, contention, and misunderstanding. It wishes to define clearly the existing rights of Japan in Manchuria, which have had legal existence for a long time; to bring about regard and respect on the part of the Chinese for these rights; and then, if we can, to co-operate with them—and, if we can, also with the Russians—for the continued and greater development of Manchuria. The principal point of difficulty at present lies in the disregard for Japanese rights shown by the Chinese authorities by constructing railway lines which violate Sino-Japanese agreements. The principal point is not so much the actual construction, as it is the principle involved. We cannot allow the Chinese to flout Japan's legal rights and privileges. On the other hand, if the Chinese, instead of going ahead in total disregard of Japan's rights, will first come to Japan to negotiate and settle such matters, they will not find Japan unreasonable. But if the Chinese insist on disregarding Japanese interests and in opposing every effort which Japan makes in various ways to further the development in Manchuria, we must call a halt now.

"It is plain that it is to the great interest of both the Chinese and the Japanese that Manchuria be developed, and while the Chinese have had the greatest profit, it is but fair to say that the Japanese have done the greater share of the work. We are willing and eager to carry on with this development, and it can be carried on only through co-operation by the Chinese and the Japanese, assisting each other and respecting each other's rights. This, and this only, is the essence of the 'positive policy'."



Mr. J. Yamamoto, new President of the South Manchuria Railway Company

Railway Competition in Manchuria

THE development of Manchuria and, concurrently, the increase of her production, is progressing at such a rate that such apprehension as has been expressed in many quarters to the effect that bitter competition will occur between Russian, Japanese and Chinese railway interests, will be found to have no basis. In spite of the building of new railway lines, production is increasing at such a rate that there will be more than sufficient freight for all of them. This is the opinion of Mr. Y. Matsuoka, who was recently appointed Vice-President of the South Manchuria Railway, the principal instrument for the maintenance and furthering of Japan's interests in Manchuria. His opinions carry weight as he formerly spent a number of years in Manchuria in his capacity of Director of the South Manchuria Railway Company. He is a man of the far-visioned, constructive type and was a great constructive force during his period of activity in the Three Eastern Provinces. In fact, it was due mainly to his initiative that the railways were built between Chengchiatun and Taonan and between Taonan, an important center near the border of Manchuria and Mongolia, to Tsitsihar, a point on the Chinese Eastern Railway, west of Harbin. This road, which was completed last year, was built by the S.M.R. as a contractor, the Chinese, who are now operating it. It is of great importance as it completed the connection between Tsitsihar and Ssupingkai, a point between Mukden and Changchun, thus opening a great, almost undeveloped region to immigration and development and providing an outlet for the goods originating there for transport to Dairen. The railway attracted considerable attention among students of China's problems, many of whom have seen therein a source of likely friction between the Russian interests, represented by the Chinese Eastern Railway, and the Japanese. Mr. Matsuoka was also largely responsible for the carrying out of the project of building a railway from Kirin, the capital of the province by that name, and Tunhua, a town east of Kirin. This line is now under construction, being built by the S.M.R. for the Chinese. Its importance lies in the fact that it forms an extension of the line from Changchun, the junction point of the S.M.R. and the C. E. R., and provides a link of

the projected line to a point on the Korean coast, which, if completed, will furnish a railway running direct from the Korean coast to Changchun, which is in the heart of a great and very fertile region.

The construction of these lines has led many to hold the opinion that the result must be competition and friction between the Russians and the Japanese. To this may be added another factor, namely potential friction between the Chinese and the Japanese owing to the construction by the former of several railways, and the planning of still others, some of which, if completed, would parallel and compete with the S.M.R. line. Such lines would be in direct violation of the Agreement between Japan and China, entered into in 1905, whereby China undertook not to construct any lines in Manchuria paralleling or competing with the S.M.R. lines. Among these lines is one running from Takushan, a point south-west of Mukden on the Mukden-Tientsin line, towards Payantala, the terminus of a railway built by the Japanese for the Chinese, which runs almost due west towards Mongolia and connects with the S.M.R. main line. This line is now under construction by the Chinese who have completed a great part thereof. The Japanese have objected thereto through diplomatic channels, owing largely to the fact that its completion would draw traffic not only from the S.M.R., but also from the line built by the Japanese for the Chinese, for which the former have not yet paid; and partly because such building constitutes a direct violation of a legal agreement. Another line now being built by the Chinese extends from Mukden in a north-easterly direction to Hailungcheng, the center of a great agricultural region. Although an agreement existed between the Chinese and the Japanese that if this line should ever be built, it must be built for the Chinese by the Japanese, and a loan was advanced to the Chinese for the purpose—which they spent for entirely other purposes—the Japanese consented to the construction of this line by the Chinese themselves, with the understanding that it should not be extended beyond Hailungcheng to Kirin. Now, however, the Chinese are making active preparations to build the link between Kirin and Hailungcheng, which will, if completed, form another road paralleling and competing with the S.M.R., main line running south from Changchun and with the Changchun-Kirin road.

All these elements contribute to the development of the present complicated railway situation in Manchuria, and as railways furnish the most important factor of the economic, and to a great extent of the political situation in Manchuria, the solution of these problems is essential. Mr. Matsuoka makes it clear, however, that the Japanese Government is concerned mainly in the upholding of the principle that treaties and agreements must be lived up to. Once this has been settled, he believes, the actual matter of the construction of these various projected railways may be settled relatively easily by mutual arrangements. Manchuria is increasing her productivity so rapidly, he points out, that the new, as well as the existing railways will have all they can do to handle the increased traffic and the much feared competition will be found to be entirely exaggerated. The Japanese are as eager as are the Chinese themselves for the development of Manchuria, which will furnish for Japan a great source of raw materials for her factories, and concurrently, develop a great population which will be purchasers of the goods which Japan manufactures from such materials. So the Japanese are interested in seeing railways increase in Manchuria and will not only be willing to see the Chinese build railways, but will assist them to do so, if such assistance is wanted, provided only that the Chinese abandon their present attitude of high-handedly disregarding and over-riding the Japanese interests which exist by virtue of long-standing legal agreements and treaties.

"The annual increase of freight carried by the S.M.R. lines has in recent years amounted to about 1,200,000 tons annually," said Mr. Matsuoka in discussing this question. "Even if we make allowance for some decrease in this ratio in future, it is entirely reasonable to estimate that such increase will amount to over ten million tons within the next ten years. To handle this vast increase of goods to be carried will call for every possible effort on the part of the railways. There will be more than enough traffic for all of them. It is more likely that they will have to call upon one another for help than that any competition will occur. There is no reason for the Russians to fear the presence of the Tsitsihar-Taonan railway, and the questions between the Chinese and the Japanese are important mainly as a matter of principle.

"For a number of years past the number of Chinese immigrating into Manchuria from Shantung and Chihli has been between 300,000 and 400,000 annually, though of these a number were seasonal laborers who returned to their homes when the Manchurian harvest was over. More recently, however, conditions in Shantung especially have become so intolerable that great masses of the population there is coming to Manchuria in order to seek in the east, tracts of rich uncultivated arable regions peace and order and an opportunity to found new homes and make a living. This year, therefore, these immigrants are bringing in their families, showing their intention to stay, and their total this year alone will be about 800,000, at least. As a consequence, the lands along the new lines are being rapidly settled and developed, and the activities of a huge army of settlers who must work hard in order to live, must cause a tremendous increase in the produce of Manchuria. I believe that this increased land development and resultant traffic will justify the building of at least 5,000 miles of new railways in Manchuria within the next ten years."

"So you will see that in the matter the construction of new railways by the Chinese the question of principle is the predominating feature as far as Japan is concerned. The building of the Kirin-Hailungcheng line, for instance, is in direct disregard of the Japanese rights and interests. The Chinese are acting as if these did not exist. Apparently they have forgotten or choose to disregard that, after all, it was Japan who preserved Manchuria for the Chinese when she not only spent her blood and treasure in driving out the Russians, who would otherwise, have made these regions a Russian territory, but even staked her existence as a nation on the issue. It is, of course, true that she fought Russia mainly for her own preservation, but at the same time she was fighting Manchuria's battle. Furthermore, Japan has worked hard during the past

Mr. Y. Matsuoka, Vice-President of the South Manchuria Railway

twenty years in Manchuria and has contributed greatly to the development and present prosperity of these provinces."

"It is evident, therefore, that Japan must feel that the Chinese are bound not only by their legal but also by moral obligations to observe the Japanese interests in Manchuria which are clearly defined by agreements and treaties. It is the principle which is at stake. If the Chinese, instead of disregarding Japan's rights and interests, should come to Japan with their proposals, they would meet with a very reasonable attitude and Japan's objections might even be withdrawn. On the other hand, if Japan should now suffer the Chinese to disregard her rights in the present instance, a precedent will become established which may eventually lead the Chinese to want to drive the Japanese out of Manchuria altogether and create a situation where Japan may have to call to their attention the fact that, after all, Manchuria is historically entirely distinct and separate from China Proper and that it may be necessary to deal with Manchuria as such."

In this connection, Mr. Matsuoka was asked what he thought of the reported Chinese proposal to develop the port of Hulutao, a point of the Mukden-Tientsin line which has for some years past been regarded as a possible great port which might serve as an outlet for goods originating in Manchuria and brought there by the Chinese lines, existing and to be constructed. Mr. Matsuoka did not, however, regard it as possible that Hulutao may be developed to the point where it would be a serious rival of Dairen. He repeated his contention that the increase of production in Manchuria would furnish traffic enough for all concerned. It would, he stated, take ten years to construct an adequate port there, and by the lapse of that time the two or three million tons which would be the maximum that Hulutao would be able to handle, would be but a comparatively small factor as compared with the general increase of produce which must accrue during these ten years.

The Winning of Oriental Trade

By A. F. Haines

ONLY of comparatively recent years have the people of the Northwest begun to visualize the possibilities of trade with the Far East across the Pacific Ocean, although the Oriental business has been fought for century after century by several European countries, each knowing that the winning of that trade meant wealth for the nation, as well as for the individual obtaining it.

Spanish, Portuguese, Dutch, British, French and Germans have each made their bid more or less successfully, and America is but a late comer. Nevertheless, this country is the nearest of all the Western peoples to the Far East, and of this country there is no state more favorably situated than Washington.

In the past more than one effort has been made to anchor Oriental trade to the United States, but for various reasons these efforts have not been other than spasmodic. Our people have been slow to reach out for foreign trade. In the beginning, more than a century, nearly a century and a half, ago, the northern states on the Atlantic Coast opened a profitable trade by sailing ships. But Boston, Baltimore, Philadelphia and New York are a far cry from Canton, then the only port open. Even the mouth of the Canton River was guarded by a Portuguese trading port, Macao, established in the Sixteenth century. Japan was not opened, Malaya was not developed, Java was jealously controlled by the Dutch, and India by the trading monopoly of the now defunct East India Co.

Nevertheless, the beginnings of that trade established certain industries on the North Atlantic Coast which have survived to this day. These, indeed, before the World War, took about 90 per cent. of all imports from the Orient arriving on these shores. The State of Washington absorbed but 10 per cent. To-day conditions have changed. Washington now absorbs about 30 per cent. and handles yet another 20 per cent., trans-shipped through the Panama Canal. Handling by the port means money to the port. That is how the great ports of the world have been built, not so much by absorption of material for manufacture or for direct use, as by the handling of goods imported or exported.

In more or less modern days this old-time trade has developed on a new basis. The Pacific Coast will be the chief factor, not the Atlantic. Also there is now existing a national commercial policy. The Federal Government is supplementing its consular service by trade commissioners. These officials are not boosting for any one particular firm or article. Their purpose is to recognize national wants and tell Americans about them, so that there may be figured out some manner of supplying them. Such wants may be cultivated, as, for example, the introduction of American cigarettes in China.

Now, if it is good for the Federal Government to so advertise and promote American interests as a whole, why isn't it good policy for the ports of the State of Washington to do likewise as to their own interests?

Nor should it be forgotten that in this respect the ports are representative of the whole of Washington. If the population of the Far East could be persuaded to eat but one apple each year apiece and buy that apple from this state it would absorb the entire export crop of Washington. Some people may think this is talking through my hat. But figure it out: There are over 400,000,000 people in China, 60,000,000 in Japan, 40,000,000 in the Dutch Indies, 340,000,000 in British India, inclusive of its feudatory kingdoms. Now throw in Siam, Malaya, French China, Eastern Siberia and the Philippines, and more than a billion is the total.

Counting three apples to a pound, or 120 to the 40-pound box, the result is one apple each year to each person, and the quotient is more than 8,000,000 boxes. I don't think I am so far wrong in my illustration of trade possibilities. One apple per year per person.

If the Oriental will smoke American cigarettes and use American flour, why should he not eat American apples? Therefore the apple grower is just as much interested as any Washington port in a trade envoy to the Orient. Also isn't the same thing more or less true with most of the Washingtonian products?

Only about one per cent. of the possible trade with China is developed. It is true that the British and others have the best part of the trade that is developed. And, once established, trade is hard to move from its old ruts. The Chinese know the British firms which have been there for decade after decade. But their trust is in personalities, though the "chop" or "hong" or trademark, or firm name, go a long way. They trade with a certain person because they know all about him. The State of Washington to a Chinese, to an Oriental, is but a geographical or political abstraction. It is not a living thing. But it becomes alive when it is identified with a Washington envoy. Which is why we should have such an envoy, or envoys, on the ground. He should be a man acquainted with the Oriental temperament and methods not less than he is acquainted with this side of the water. Also he must be content to remain there for a term of years and thus become a well-known and trusted personality.

By the Washington State Chamber of Commerce the proposal was placed before the Seattle Port Commission. That body instantly grasped the importance and has agreed to put up 50 per cent. of the cost if the other ports of the state will put up the other half. The matter has been laid before them for consideration. What the outcome will be I do not know. But the idea should not be allowed to fall by the wayside even if the Port Commissions of the state are not willing to take it up conjointly. There are other persons and interests also vitally concerned. Every resident of the state is interested. So is the state itself. A fraction of a mill tax now will reduce taxes materially by increasing our wealth and business.

Few people realize—take the apple grower as an example—that it costs no more to send a box of apples to Shanghai than to Butte, Mont. That box can be landed in Manila much cheaper than in New York. Europe is now looked upon as the great market, but apples can be landed in Hongkong at only two-thirds the freight to Europe.

Just how many envoys should be selected depends upon the cash available. Perhaps the first should be to Shanghai, but Japan and the Philippines are of great importance. For from the latter it is only a matter of a couple or three days' steam to Labuan, Sarawak, Singapore, Bangkok, Saigon or Haiphong.

Engineering Notes

Japanese Capital in China.—According to the "Manchuria Daily News" the total Japanese capital invested in China amounts to Y.1,857,000,000. Of this amount, Y.626,000,000 represent bank advances.

Hydraulic Control Gear for Japan.—The water supply to four turbines, with an aggregate horse power of 126,000, at Komaki, on the Sho river, Japan, will be controlled by valves manufactured by Messrs. J. Blakeborough & Sons, Brighouse.

Japanese Agency for Electric Furnaces.—Messrs. Automatic and Electric Furnaces, Limited, 173-175, Farringdon Road, London, E.C.1, announce that they have entered into an arrangement with Messrs. G. Blundell and Company, Ltd., 7, Yamashita-Cho, Yokohama, for the sale of Wild-Barfield electric furnaces in Japan.

Switchgear for Perak River Hydro-electric Co.—Over 100 circuit breakers, weighing up to 10 tons each, and 700 high-voltage insulating switches, are being built by the Metropolitan-Vickers Electrical Co., Limited, Trafford Park, Manchester, for use in the Kinta Valley tin mining district which derives its supply of electricity from a hydro-electric station at Chendoroh, near Penang, owned by the Perak River Hydro-electric Co.

Air Services in The Far East.—It is proposed to establish an air service for passengers and mails between Osaka, in Japan, and Shanghai, in China. A company has been floated in Japan for the purpose, with a capital of 2,000,000 yen. Japanese aeroplanes are to be used for the start, but orders may possibly be placed in other countries when the full complement of machines is needed. The journey is to be made in three stages and will, it is estimated, occupy a total time of 11½ hours.

Industrial Works in Tsingtao.—Most of the industrial works in the former Kiaochow Leased Territory are at Szefang and Tsangkow, two outlying towns in Tsingtao suburbs, both being on the Kiaochow-Tsinan Railway. They were developed as industrial centres by the Japanese during their occupation of Tsingtao. There are seven cotton mills, one chemical dye-stuff manufacturing plant and a number of modern brick manufactories operating at these two towns. Of the brick manufactories only a few are in operation, the rest, mostly Japanese owned, having been suspended owing to the slackening demand for building materials in Tsingtao. Of the seven cotton mills the majority, including the Naigai Water Kaisha, the Kanafugchi Cotton Spinning Co., the Nakasaki Cotton Spinning Co. and the Dah Kong Cotton Spinning Co, are Japanese owned. The dye-stuff manufacturing plant is owned by Chinese capitalists. Although most of the brick and tile manufactories are financed by Chinese capital, the Shantung Pottery Works is a Japanese concern. It is operated on a large scale.

Motorship Statistics.—The following figures are taken from Lloyd's Register Shipbuilding Returns for the Quarter ended 30th June, 1927:

1. Among the Merchant Vessels under Construction in the World, motorships take the first place with a total Gross Tonnage of 1,459,595 tons. This is the first time that this figure has exceeded the gross tonnage of steamers under construction.

2. From table 3, entitled "Marine Engines under Construction in the World," it is seen that Switzerland takes the fourth place in "Countries of Build," coming after Great Britain, Italy and Germany, with a total of 93,850 I.H.P. In Switzerland, Sulzer Bros. is the only firm building Diesel Marine Engines for merchant vessels, so that the above statement means that:

The total horsepower of Diesel marine engines under construction in our Works at Winterthur at the end of June, 1927, exceeds that of the Diesel marine engines under construction in the whole of Denmark, or of Holland, Sweden, France, etc.,

Manchurian Gold Fields Co., Ltd.—During the year a British syndicate, backed by large capital in London, known as the Manchurian Gold Fields Company, Limited, has been negotiating with the Chinese authorities and local mine-owners with a view to exploiting the possibilities of gold in northern Heilungkiang. If the negotiations are successful, it will result in the employment of foreign capital in gold-mining in this region for the first time.

New Docking Facilities on the Yangtze River.—The Kailan Sales Agency is constructing a hulk at Kiangyin, on the south bank of the Yangtze in the Province of Kiangsu, in order to facilitate the discharge of coal from ships for transhipment by barges to the factories in Wusih and Changchow. This will eliminate the rail journey at present necessitated over the Shanghai-Nanking Railway from its wharf at Woosung, which is situated at the mouth of the Yangtze river. The construction of a branch line to connect Kiangyin with the main line at Wusih, the most progressive industrial city in China, has already been mooted, but lack of funds have prevented the carrying out of the project.

Motor Cycles in Japan.—The motor cycles, says a recent report from Tokyo, is making a great advance in popularity among the Japanese. It fills a real want in Japan, since it affords a rapid means of travel on the narrower roads which are inaccessible for cars. There have been pleasing indications, particularly during the past year, of the increased use of British machines. It is being realised that, while handier to ride than the more powerful American machines, which are their principal competitors, and are largely used with side-cars or parcel van attachments, the British machines are thoroughly reliable and capable of all the speed required. In the provinces they have the advantage that they can be pushed or lifted more easily over bad places. A considerable variety of makes are now represented in Japan, and are reported to be giving satisfaction. Manufacturers of motor cycles would be well advised to pay especial attention to the registration of their trade marks and trade names. Though the latter are protected by international convention without the necessity of registration, the number and variety of such names is so great that unscrupulous applications to register them as trade marks are extremely difficult to detect, and when registration has once been effected the legal procedure for cancellation must ential expense.

Mining in Anhwei.—In 1926 the Government Mining Administration of Anhwei had three mines in operation each equipped with boilers, pumps, telephones, hospital, lighting plant, fans, and various other mining machinery. These mines are: 1. Shuitung mine a bituminous coal mine, situated in the Suanchen district about 70 *li* from the city. It has a producing capacity of 120 tons a day. The output for 1926 amounted to 28,408 tons. A light railway connects the mine and Shwangkiao, on the Neiho. It has two light locomotives, 20 5-ton coal-cars, and six third class passenger-cars. The traffic along this line is very great. Shwangkiao coal is afterwards transported to Wuhu by native junks towed by steam-launches, when the condition of the river makes it possible. 2. Mantoushan mine a soft anthracite coal mine, situated in the Kweichin district about 15 *li* from the city. Its production is about 100 tons a day. The total output for the year was 15,362 tons. This mine is connected to Siakiangkow on the Yangtze, by a 2-foot gauge track of 9 *li* distance, run by push-cars of 1½ tons capacity. 3. Yinchiahui mine which also produces soft anthracite coal, is situated in the Kweichih district about 50 *li* from the city. It produces about 50 tons daily, and the total output for the year was 6,000 tons. A 2-foot gauge track carries the coal from the mine to Penghwangtsui a distance of 5 *li*. Thence the coal is transported by the river. Besides, a coal briquetting plant has been established at Wuhu, compressing the dust anthracite coal into egg-shape briquettes. Its production is 20 tons a day. These briquettes are very much in demand and find a ready market.

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THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

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OUR PACIFIC COMMUNICATIONS

BY GEORGE BRONSON REA

THE NORDIC SNOB

DISCOVERING ADMIRAL BRISTOL

REGIONAL GOVERNMENT FOR CHINA

BY GEORGE E. SOKOLSKY

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Our Pacific Communications

American Public Opinion Demands Increased Cable and Radio Facilities

By George Bronson Rea

FOREWORD: The recent announcement that the Western Union Telegraph Company would lay a new high-speed cable under the Pacific, linking the United States with China has created a renewed interest in our communications with the Far East. The decision was arrived at during the recent crisis in China when our government was unable to keep itself fully and promptly informed of the rapid changes in the situation. It is also the belief of the Western Union Telegraph officials that the trade of the United States is now to reach out towards the Orient rather than to Europe and that great developments in that direction are to be expected in the near future. In the opinion of President Carleton, commercial requirements alone fully justify the extension of our Pacific communications, a need that was accentuated by the recent events in China when European capitals had the advantage of being served by three cable lines while Washington had to rely on one slow-speed cable linking China with the United States.

The Western Union cable and radio plans are announced at a time when the long drawn out dispute between the Mitsui Company of Japan and the Radio Corporation of America is still unsettled. This clash of interests is the only outstanding question between the American and Japanese governments. In order to more fully explain the American position, Mr. Manton Davis, the assistant attorney-general of the Radio Corporation, recently read a paper before the Institute of Pacific Relations at Honolulu, in which he suggested a round-table conference between the Americans and Japanese with a view of arriving at an amicable adjustment of their differences through co-operation.

The situation is complicated by the fact that the Japanese company has carried out its contract and erected a high-powered wireless station at Peking while the American company, due to no fault of its own has as yet been unable to start work on its station at Shanghai. In fact, to date, it has been heavily penalized in out-of-pocket expenses in protecting its contract, and, due to the obstacles placed in its path, the American people and government have been deprived of a rapid and efficient communications service with China which the events of the past year have made imperative for the proper protection of our interests in that country. In the meanwhile, both the Japanese and American rights are being undermined and rendered worthless by the erection of a new work of wireless stations throughout China some of which, like the one in Canton, are able to communicate with Europe and possibly the United States.

The Open Door and China's Sovereignty

The Crux of the Radio Dispute

All factions in China are united in demanding an immediate revision of the so-called unequal treaties, and whenever a government representative of the whole country is established, this issue must be faced by the foreign Powers. Under new treaties, foreign trading rights in China will be defined and governed by the most favored nation treatment. The Open Door Doctrine will automatically disappear and no foreign government will be justified in interfering with China's freedom of action in making contracts, granting concessions or establishing monopolies.

Briefly stated, the Open Door doctrine is an international understanding to respect the principle of equal opportunity for the commerce of all nations in China, binding upon those Powers who accepted John Hay's original proposals and upon those who subsequently incorporated the principle in their various Far Eastern agreements. It is highly important to remember, however, that previous to the Washington Conference, China herself had never become a party to the many interlocking treaties and agreements establishing and defining the doctrine. In fact, while outwardly acquiescing in its principles, the Chinese Government insisted that these interchanges of foreign diplomatic correspondence constituted a direct intervention in its affairs. The record proves conclusively that the Chinese Government reserved the right to exercise its own discretion in the matter of loans, development contracts and industrial concessions. China could not admit the right of other Powers to intervene in such matters without completely surrending her sovereignty and in some cases invalidating agreements previously entered into.

When, in 1899, John Hay promulgated the Open Door Doctrine and committed the other Powers to respect the territorial integrity of the Chinese Empire, the Empress Dowager had already surrendered her sovereignty over Manchuria under the terms of a secret alliance with Russia, signed in 1896. China could not therefore in 1899, extend its approval or adhere to the Hay proposals without repudiating this alliance and inviting swift and certain punishment for her perfidy. China was caught in the web of Li Hung-chang's secret diplomacy and dared not endorse a doctrine devised by the American Secretary of State for her protection. Other Powers, at America's invitation, could and did exchange communications creating a principle for the protection of their mutual trade interests, but China could not then, or at any time during the fifteen years life of the secret treaty with Russia, approve any international convention conflicting with her existing obligations. The history of China's railway and loan negotiations indicates in no uncertain manner that never did she subscribe to a doctrine which impaired and at times even denied her independence of action in matters closely connected with her sovereign rights.

To this refusal of the Powers to recognize China's position, is traceable the many foreign diplomatic disputes over loan and development contracts, and to some extent, her present attitude on the unequal treaties. When these international agreements denied to China the full exercise of her sovereign powers in developing her industries and communications, they over-stepped their original purpose and became, in the opinion of the Chinese, an intolerable intervention of their affairs.

Open Door and Railway

A case in point occurred during the early months of 1924, when the American State Department, for reasons which have never been explained, denied China's right to contract with an international finance and construction company to build a 10,000 mile system of new national railways. The State Department held that such a contract constituted a monopoly of railway construction in China and as such violated the treaties which prohibited monopolies.

Notwithstanding that a reputable American construction firm backed by strong financial interests, enjoyed equal participation in the enterprise, Secretary Bryan refused to support it. In the opinion of President Yuan Shih-kai, this constituted an unwarranted interference in the sovereign affairs of his government.

China's attitude toward the Open Door doctrine was clearly set forth in the Siems-Carey railway contracts in 1916, in which the Chinese Minister of Communications specified five railway lines for the Americans to build, conflicting with rights previously ceded to other Powers. The Chinese raised the issue of the Open Door between the United States and the Four Allies at a time when the latter were fighting for their existance in Europe and sat back to enjoy the spectacle of the American Government fighting over a doctrine they had never subscribed to. The Chinese then contracted a loan with the Continental and Commercial Bank of Chicago setting aside revenues for its security previously allocated for the service of a French loan. Again they watched with great satisfaction the diplomatic conflict between Washington and Paris which culminated in the disclosure of a secret agreement conceding to France a monopoly of railway construction in Kwangsi province and the recall of the French Minister to Peking.

Open Door and Radio

In the same way, the Chinese raised the issue of the Open Door between the United States and Japan over the Radio contracts. In this instance, the formal contract between the Chinese Minister of the Navy and the Mitsui Company of Japan, was duly signed by both parties as a purely business proposition involving no conflict with the Open Door principle. After its execution, the Chinese Government obligated itself in a supplementary and secret resolution to prohibit for thirty years the operation of any other wireless station in China. The resolution reads:

> "During the period of thirty years mentioned in Article 4 of the contract, the government shall not permit any other person or firm to erect, nor shall it erect itself, any wireless station in China for the purpose of communicating with any foreign country."

This resolution would indicate that China did not consider herself bound by any limitations on her contractural independence.

High Chinese officials, declare that in allocating the radio revenues as security during the thirty year life of the Mitsui loan, their Government violated no previous agreements, secret or otherwise. They say that their blunder consisted in maintaining secret the supplementary guarantee. The Chinese Government of 1918, could not foresee that a future cabinet antagonistic to Japan, would enter into a radio agreement with a foreign company invalidating the Mitsui guarantee, but it invited this contingency by binding itself to secrecy.

When, in January, 1921, a Chinese Minister of Communications concluded a further agreement with the representative of the Federal Telegraph Company the resolution could no longer be mantained secret. In order to protect their interests, the Japanese were compelled to reveal its existence and in doing so, brought upon themselves the onus of having violated the Open Door doctrine.

Much water has passed under the bridges since 1921. At that time it looked as though Japan and the United States might be forced into hostilities over China. Conditions have changed. The campaign to incite hostilities in the Pacific failed. Japan and America are now linked together by intimate commercial and financial ties. Their Chinese policies are identical. Aside from the Exclusion Clause in our Immigration Law, there is nothing to mar the present cordial relations except this radio dispute. For the sake of everybody concerned it is time it was wiped off the slate. The American people are demanding increased communications with China. Our Government cannot be expected to remain satisfied with one slow-speed cable under the Pacific during a crisis in the Far East, when European capitals are served with three high-powered lines.

The Radio Corporation of America through its counsel, makes out a convincing case against Japan but refrains from arraigning the Chinese for their part in the transaction. This three cornered controversy cannot be settled in fairness to all parties, unless China voluntarily assumes responsibility for her mistakes. Here is the rub. No Chinese Government would dare assume such a responsibility and admit the right of foreign Powers to interfere in its sovereign affairs. This explains, in large part, why to date, the radio dispute remains unsettled.

The Inevitable Compromise

In his recent address, Mr. Manton Davis of the Radio Corporation, pointed the way to a business-like solution to the dispute and the Japanese concerned have also expressed from time to time a sincere desire to have this matter settled as soon as possible in order to eliminate all points of friction with the United States. Whatever is to be done along these lines should be done at once. We are rapidly approaching the end of a long period of misunderstandings arising out of foreign limitations upon China's independence in her contractural relations with foreign corporations. There is little reason to doubt that when the present "unequal treaties" are revised, China will insist upon complete independence of control over her interior and exterior communications.

In the present temper of all factions, nothing will satisfy them but a full and complete recognition of China's sovereignty in all matters. When the old treaties are revised, all limitations upon her freedom of action will disappear and no foreign government will be justified in invoking the Open Door principle. China will then be able to enter into development contracts and give whatever security she deems proper for the service of the loans. She can, if she wills, contract with a Latvian, Portuguese, or an Irish firm, for the construction of her entire railway system without fear of interference from other governments. She can grant or create monopolies and no foreign government may obstruct her right to borrow from any one country or group of countries.

The Open Door doctrine cannot be enforced in China's present frame of mind. It is a waste of time for friendly governments to indulge in further diplomatic squabbles over a principle China declines to adhere to and which, at all events, is destined to disappear as soon as new treaties are negotiated. In the face of the present situation in China, the interests of the United States and Japan would seem to be best advanced by coming to some mutual understanding concerning their respective radio contracts before the march of events invalidates both contracts.

With the Japanese, as well as the Chinese, how a thing is done is frequently more vital than what is done. Intentionally or otherwise, Japan may have violated the Open Door principle in accepting the secret resolution as a guarantee for the repayment of the Mitsui loan. If the Americans have a strong case, the Japanese have an equally strong and convincing argument. In the last analysis, the Chinese simply exercised their undoubted sovereign rights over an undertaking coming directly under the supervision of a government department. For the sake of cementing her relations with the United States on a solid basis, Japan would undoubtedly accept an invitation to a round-table conference to discuss and settle this one outstanding dispute, but she would never consent to attending any conference where she is to be arraigned before public opinion as violating the Open Door doctrine.

The Radio Corporation of America is entitled to carry out a contract entered into in good faith with the Chinese Government or be indemnified for all its out-of-pocket expenses and loss of prospective profits. If the execution of this contract invalidates a previous undertaking with Japan, also entered into in good faith with the recognized Chinese Government of the day, the Japanese have a just claim upon China for full compensation and damages for non-fulfillment of contract. Exercising their sovereign powers, the Chinese authorities entered into a contract with a Japanese company to create and operate a branch of its official activities which it holds as a government monopoly and gave as security the revenues to be derived from this monopoly. Three years later, they signed a further contract which invalidated the previous one, and, rather than come out fairly and squarely in defense of their undoubted sovereign rights in the matter and accept the penalty for breach of contract, they have waited for the American Government to deliver them from their predicament by invoking the Open Door Doctrine against Japan. In the meanwhile, radio stations are being erected in nearly every provincial centre in China. Only recently, a German company erected for the Southern Chinese Government a high-powered wireless station at Canton, communicating with Europe and all points in Asia and Malaysia. Now comes the Western Union Telegraph Company with its elaborate plans for a new high-speed cable under the Pacific supplemented by a radio service that still further impaires the value of the Radio Corporation's contract. By the time the Chinese Government is once more competent to fulfill its obligations, about all that will be left to the Radio Corporation of America will be a worthless contract

The Depreciation of Rolling Stock

By H. Stringer, B.A., A.M.I.C.E.

THE economic factors controlling the depreciation and scrapping of railway rolling stock appear to be of a different order to those governing other machines.

In the latter case improved designs, and increasingly heavy repairs may decree scrapping from the ordinary economic view point. But is this view point, as applied to rolling stock, in any sense the ordinary one? Is not rolling stock railway life blood and is not any withdrawal conducive of railway anaemia, for up to a limit which Indian and American practice seems to indicate as about 25 loads per car per year the more cars in service the less time under repair, the better for the railway.

Again rolling stock is not as other machinery. It is not, motor-car built delicate and liable to irreparable injury by vibration. It has none of the delicacy of the high speed engine nor can careless handling damage it hopelessly as in the case of electrical machinery. Entire wreckage as the result of accident is much more rare than in the case of other machines.

Again the design of cars has crystallised, the high capacity car except in England has been almost universally adopted, continuous brakes can be fitted if not provided, automatic couplers also with slight structural alteration.

In the case of locomotives modern improvements can also be installed as a rule with sufficient economy to warrant them. Thus superheaters can be fitted to old type engines and the same applies to feed water heaters. Again for those engines not considered worth while there is always a sphere of usefulness in pick-up goods traffic requiring a lot of shunting on sidings not up to the weight of main line heavy goods engines.

A further and decisive factor is that rolling stock earns all or nearly all a railway's money. For capital cost rolling stock earnings are enormously high. Thus on the Chinese Government Railways in the 1922 report rolling stock was capitalised at $118.2 millions. The gross revenue earned was $99.5 millions so that rolling stock carried merchandise to the amount of 48% of its capital value during the year. Rolling stock is thus in that category of machinery where earnings are enormous compared with capital cost but where these earnings have to meet the interest on a large amount of necessary but unproductive capital expenditure. This indicates the costliness of keeping wagons and engines a long time under repair and the sound policy of keeping this percentage low. It also serves as an indication of the extent to which the repair process should be pushed in the maintenance of vital machinery.

The question arises as to the life of a machine. The life of a machine in theory is obtained by equating the capitalised cost at compound interest of the average annual repairs for the life period to the original capital cost. Thus the average repair charge per wagon on the Chinese Railways in 1922 over an eight year period amounted to $73.22 per annum. The bulk of Chinese government rolling stock is of 30 tons capacity costing before the war with steel underframe $3,000. (£250). The average life of rolling stock when the above repair charge is capitalised at eight per cent. is 19 years this being the period when the capitalised repair charge will amount to $3,000. The average repair charge per locomotive over a similar period amounted to $3,024 per annum and the pre-war cost of a tender locomotive with 16 ton axle loads suitable for the standard 85 lb. rail was about $40,000. (£3,400). Under the same conditions as above life would amount to 10 years only.

The application of this theory to locomotives remains at variance with actual facts even when the enormous rise of the price of material and to a certain extent of labour is taken into consideration. Thus if the present day cost of rolling stock is taken as the life criterion. The 30 ton wagon would now cost $4,000 and its life according to the above repair basis would be 22 years while the locomotive costing now $68,000 (£8,000) would have a life of 13 years only, still very largely at variance with actual practice in any country.

For instance the average age of locomotives on the two principal Chinese Railways was 13 years in 1922 and the average for the whole system 10 years. Thus if we consider a wagon in detail it will be found that fully 78 per cent. of the cost of a car lies in the bogies, trucks and brake gear. Opinions as to the life of the truck itself vary but it cannot be less than 30 years. As for the life of axles it is only customary to withdraw them for journal wear—not less than 25 years.

Tyres can be renewed indefinitely. In any case the life of unbraked stock can be safely placed at 20 years while braked stock has a tyre life of from 10 to 16 years according to type of line.

Again the life of a wooden underframe is in many cases as much as 25 years provided there is a general overhaul every 3 or 4 years and that new sills are provided at least once during this period. As for the life of a steel underframe this is indefinite but when this is contrasted with the known thirty year life of a steel sleeper under comparatively adverse conditions it can be safely placed at from 40 to 50 years with proper painting and attention. It is thus seen that as regards the most expensive elements in car construction axles and tyres are the only parts within the life period calculated previously. Who is going to argue that a car is not worth two or three axles* and as many tires in these expensive days? Again depreciation implies deterioration; there should therefore if this is taking place be some period in the life of a car at which loads be reduced or withdrawal take place. Such is not the practice prevailing at present in China. The repair process is pushed to its uttermost limits, many cars are still running after 25 years' service showing no apparent deterioration but without an asset value owing to the depreciation scale of charges prevailing. These begin from the day the car begins to run and continue at the same rate until withdrawal an initial absurdity in any case.

Again consider the case of the life of locomotive elements. The life of coupled wheel tyres is about 400,000 miles or about 13 years at 30,000 miles of running per annum. As regards the important item of fire-box life this varies very much on the nature of service heavy demand for steam and the quality of water. Generally speaking a thorough overhaul takes place every 4 to 5 years all tubes being removed and the foundation ring. It may be found that the lower half of the fire-box needs renewal and perhaps the tube plate but in many cases a tube plate will last from 8 to 9 years without renewal. Fire box crown plates last much longer as much as 15 or more years of service being recorded for many boilers. A very fair average life for a fire-box is from 8 to 4 years.

With regard to tubes these have to be withdrawn after the locomotive has run from 80,000 to 100,000 miles or say 2 years service. They are them scaled, have new ends welded on and are good for another two years' service, when they can be cut and used in shorter boilers. Thus a boiler tube may have a life of from 4 to 8 years. Super heater tubes have to have the same treatment as boiler tubes that is they need examination and attention every two years but the life of these tubes may be considered as from 8 to 10 years.

We have now considered the most vulnerable elements in a locomotive, the parts of least life. As in the case of cars these have a very small percentage to the total cost of the whole machine which has a known life of at least double that of the longest lives of the above elements.

It is thus seen that the theoretic life obtained by capitalising repair charges alone is obviously not in accordance with actual life or practice. If a depreciation charge is added to this, life becomes theoretically shorter and increasingly absurd. Further as regards the question of depreciation as indicated in repair charges there is very little evidence that repairs become increasingly heavy with age. A wagon or locomotive leaves the shops after overhaul as good as new, capable in every respect of doing the work it did when new. Why then depreciate arbitrarily until the time arrives when this is evident?

The ruling of the Chinese Railways as regards depreciation is as follows: "A monthly sum equal to one twelfth of one twenty-fifth of the cost of each unit is charged off to form a depreciation reserve, and when a unit is retired this reserve is charged with the difference

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* Axle for 40 Tons Car $25 only. Tire for 40 Tons Car $ 68 only.

decision of the Ministry of Communications to allow competition in certain districts. The surplus of power has brought about competition in power sales and the purchase of small companies which possibly may provide outlets.

At the end of 1926 the authorized capitalization of the electric power industry was Y.3,115,800,000, of which all but about Y.500,000,000 was paid up. The total foreign investment in the industry was Y.195,000,000.

Tokyo Light Largest

The Tokyo Electric Light Company is the largest of the electric power companies and the largest industrial corporation in Japan Proper in point of capitalization and assets. Its capitalization is Y.345,724,000, almost fully paid. Its debentures outstanding total Y.163,590,800 and it has bank loans to the extent of Y.79,925,578.

Thus, the paid capitalization of Tokyo Dento is about 13 per cent. of that of the entire industry.

On May 31 of this year, the total generating capacity of the company was 387,925 k.w., about 11 per cent. of that of the entire industry. This was divided into 313,150 k.w. of hydro-electric power and 74,775 k.w. of steam power. The company also purchased 227,955 k.w. of power from other companies, giving it a total of 615,880 k.w.

On the same date the company's aerial transmission lines covered 2,688.7 miles with 11,879.8 miles of wire. The equivalent figures for underground lines were 160.1 miles and 545.3 miles of wire. The company maintains 198 sub-stations, with an aggregate equipment capacity of 2,215,000 k.v.a.

During the six months' term which ended May 31, the company added 363.748 electric lamps to its connected load, bringing the total to 7,378,781 lamps. Power sales increased 8,485.7 k.w., bringing that total to 430,901.7.

Figures on Growth

Figures on the growth of the company's capacity and sales of power and lights follow, for the last three half-yearly terms :

	1927—1st	1926—2nd	1926—1st
Generating capacity (k.w.)	387,925	363,587	328,100
Bought power (k.w.) ...	227,955	216,778	189,700
Total power (k.w.) ...	615,880	580,365	517,800
Power sold (k.w.)... ...	430,902	422,416	392,103
Lights supplied	7,378,781	7,015,033	6,700,058

Selected items from the balance sheets and profit and loss accounts of the company for the same periods follow :

	1927—1st (000's omitted)	1926—2nd	1926—1st
Paid capitalization ...	Y.345,724	Y.345,724	Y.345,724
Fixed assets	540,369	491,454	491,247
Construction a/c. ...	23,912	55,302	41,272
Receipts	52,609	50,869	57,824
Depreciation	2,200	2,200	1,700
Net profits	16,460	16,624	16,934
Brought forward	3,057	2,830	2,793
Av'ible dividends... ...	19,518	19,455	19,726
Distributed :			
Legal reserve	830	840	850
Dividend	15,558	15,558	16,047
Carried forward ...	3,130	3,057	2,830

Toho Solid Company

The Toho Electric Power Company, under the able management of Mr. Yasuzaemon Matsunaga, is recognized as the solidest of all the Japanese companies of the electric power industry. Its capitalization is Y.102,204,226, paid up.

The company was organized in 1889 by its parent, the Nagoya Dento Kabushiki Kaisha. In 1917, the Nagoya company transferred its rights in the Kiso and other rivers to a new company which now has become the Daido Electric Power Company. In 1921 seven companies, including the old Nagoya company, were merged to form the Kwansai Electric Company. Other mergers followed, the present Toho Electric Power Company emerging.

The Toho Electric Power Company sells power and light to one city, 12 towns and 66 villages in the Kwanto and ten cities, 84 towns and 448 villages in the Kwansai. It has 589,686 customers, 1,588,788 lamps and 101,220 k.w. of power sales. It has 2,208.5 miles of high tension and special high tension lines for power and 15,460.9 miles for distribution.

The Depreciation of Rolling Stock

(Continued from page 496).

between the original cost and its scrap value." This fixes an arbitrary life of 25 years which cannot under present conditions of practice prevailing be considered as accurate. Repairs are pushed to indeterminate limits, new rolling stock is bought, not to replace old, but to increase the chronic shortage of cars which prevails in most countries whose railway system is not an old institution. It is a curiously illogical fact that no attempt is made to depreciate rails, only 20 percent of whose weight is available for useful life, and whose renewal is a very expensive item, undoubtedly warranting the creation of some form of sinking fund for replacement.

The quesion of depreciation would therefore appear to need adjustment to be more in accord with actual fact and practice.

Navigation on the Sungari

The question whether vessels flying the Russian flag are permitted to navigate the Sungari or not has been definitely settled this year by a decree, promulgated at Mukden in August, ordering the transfer of all vessels and navigation property owned by the Chinese Eastern Railway to the Chinese naval authorities. Orders were also issued to detain certain ships flying the Chinese flag but suspected of being operated in partnership with Russian capitalists. As far back as the beginning of 1924 a similar decree was issued by Marshal Chang Tso-lin, prohibiting any vessels other than those flying the Chinese flag to navigate the inland waters of Manchuria. As a result, foreign shipping companies, with the only exception of the Chinese Eastern Railway, were compelled to sell out to Chinese owners or transfer their vessels in some way or other to the Chinese flag. Though the Chinese Eastern Railway fleet was only partly Russian, its ensign being the joint flags of the Chinese and Soviet Republics, its vessels were also included in this prohibition. In consequence, the Chinese Eastern Railway flotilla has been idle during the past two navigation seasons, thus accentuating the lack of light-draught barges, of which the Chinese-flag owners are very short. This inactivity has meant a great loss to the Chinese Eastern Railway, whose fleet was by far the largest in Harbin, numbering 11 steamers and 30 barges, with a carrying capacity of about 18,000 tons. To put an end to this abnormal situation, the above-mentioned decree by Marshal Chang was carried out in the beginning of September, regardless of many protests from the Soviet Government, and the Chinese flag was hoisted over all the offices of the Chinese Eastern Navigation Department.

High Frequency Telephony Over Power Transmission Lines in Japan

This problem was taken up in Japan in 1917, six years after the publication of details of systems of Ruhmer in Germany and Squier in America on wired wireless systems, but was conducted on the lines of valve technique rather than with arc generators. Experiments were conducted in 1918 over a line 125 miles in length. Later in the same year, on a 22,000 V line 20 km. long connected to a complicated network, excellent results were obtained with 5 W in power and a wavelength of 3,000 m., using extra high tension condensers.

Later, to avoid the use of such condensers, lengths of conductor were run for some distance below the main conductors, and a satisfactory system was developed. Owing to the fact that in this directional work the receiving energy may be large and the high frequency path is almost a closed circuit, disturbances from interferences, static troubles, etc., are remarkably reduced as compared with ordinary radio work; a simple and sure calling device can therefore be used. One which utilises the principle that a change in anode current of a receiving valve can be caused by a change in grid voltage brought about by arriving oscillations.

There are four installations in use in Japan. That of the Kingugawa Co., 123 km. in length, with a 66,000 V line with wavelengths of 7,500 and 9,500 m.; Ugigawa Co., 34 km., 22,000 V, wavelengths 1,000 and 1,700; Tokyo Co., 194 km., 154,000 V, 8,000 and 12,000 wavelengths; and Nihon Co., 313 km., 89,000 V, 8,500 and 11,500 wavelengths.

The coupling wires are several hundred inches in length, and are spaced from 2 m. to 4.5 m. minimum distance from the main conductors. The first three of the above operate on the system developed by the State Electrotechnical Laboratory.

British-Built Coaching Stock for Imperial and Foreign Railways

By G. G. Jackson

BRITISH supremacy has been challenged on all directions within the last few years, and specially in the particular trades in which this country had a distinct lead. In many cases markets which were ours completely—or nearly so—are now scarcely open to us, and there is the usual wail from the pessimists.

In one direction, however, there is room for optimism, and that is in connection with railways. Not that foreign markets are so entirely British as they once were, but we do find that, over and over again, despite severe undercutting from Continental and U.S.A. builders, the contracts still come to Britain. Particularly is this true in the case of locomotives and coaching stock, whilst in the matter of goods stock, steel rails, general equipment, especially signalling, the British makers may be said to be holding their own.

It is fitting that this should be the case, since Britain may claim to be the real home of railways, and also that the existing systems in this country are still ahead in the race for efficiency, equipment, and good workmanship, both of track and rolling stock.

In this, and following articles, we are more concerned with British-built rolling stock for overseas, having already glanced briefly at home production for home railways.

In the great dominion of Australia, with its rather complex railway systems comprised of three distinct gauges, home-production is increasing so rapidly that the British builder will soon be more or less completely ousted. The Australians have learned their lesson, and learned it well. But, quite recently, British builders have been called in to execute orders, totalling 50 all-steel coaches, for the electric lines of the New South Wales Government Railways, Sydney Suburban Section. The bodies, under-frames and bogies were built in the home country, and then, in sections, despatched to Sydney, where local craftsmen undertook their erection. In addition, the complete furnishing and painting of the assembled cars was undertaken in Australia.

The overhead trolley system, now no longer in favor on British railways, has been adopted for this electrification scheme, and the cars are exceptionally large and well proportioned. Thus, the motor cars are equipped with driver's compartment, and then three distinct passenger compartments also, the latter being inter-communicating by vestibules, in which are situated the main doors for entry and exit. These are of the sliding type, with which Londoners are now so familiar on their underground trains. The sliding doors are planned to have no center post, and access to the compartment is gained by means of single sliding doors. But end doors, of the double-swing type, provide for inter-communication between the cars.

The under-frames are exceptionally well-designed, and are built up of steel pressings, plates and rolled sections. Each under-frame was made in two sections, so that, on arrival, all that was necessary was the joining up in the center; care being taken in the design that there should be no weakness here. The body framework consists of pressed steel pillars between the windows, also at the compartment corners and ends, where they form the door-posts. The framing on the outside consists of specially treated steel plating, the idea being to prevent corrosion by the use of good lead coating. On the inside, some very highly finished steel pannelling is found. The windows are frameless, placed in felt guides in the steel pillars, but mahogany louvres are provided for the hot weather, and to secure perfect ventilation.

The doors are of cast aluminium, with lights in the upper panels. Pressed steel arch bars are used for the roof framing, upon which are riveted lead-coated steel sheeting. The ceilings of the cars are formed of "Agasote," a fire-resisting composition sheeting.

The lighting of these cars shows a distinct advance on the old-fashioned method of an electric light bulb immediately under the roof, which makes reading a most difficult process in many British electric and steam trains.

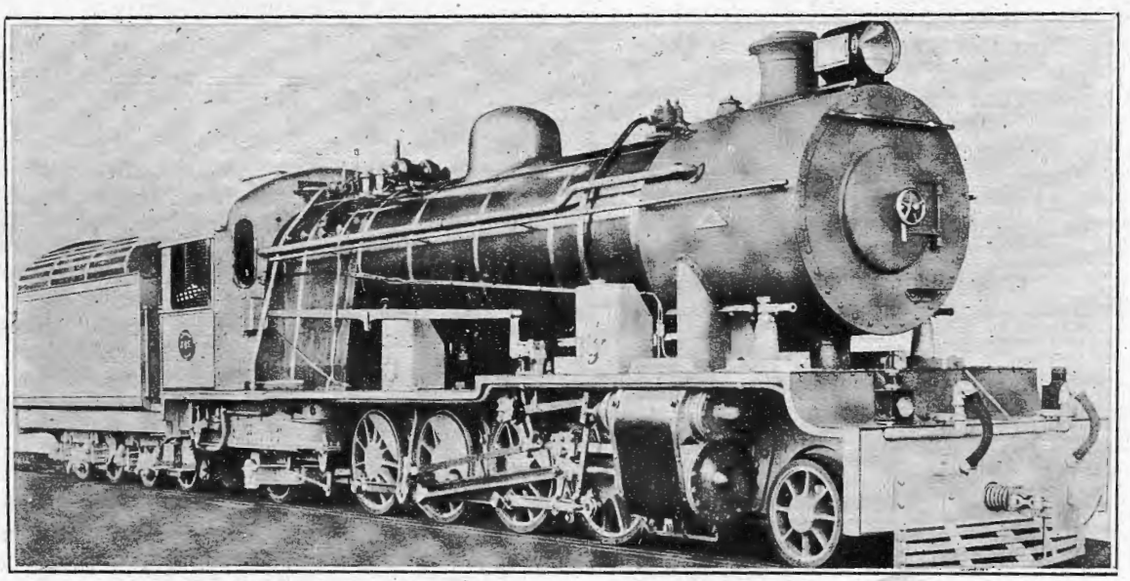
The electric lamps, in these coaches, are fitted behind trough-shaped, white opal shades, and these are spaced out with intermediate pressings of the same contour to form two practically continouus ceiling mouldings, running the length of the car, one on each side of the center line. The general effect is distinctly pleasing, and gets rid of the rather monotonous range of ceiling so often found in steel-built coaching stock. In addition, a very equal light distribution is effected.

In countries where extreme heat is experienced, not the least difficulty of a designer is to ensure an equable temperature within the coach. In the case of the stock under review, this had been attempted by using a heavy green baize insulation between the two steel sheathings of the sides. The roof has been insulated by the provision of an asbestos cell secured to the outer sheathing of the coach body (between the outer and inner lining), so that it is claimed that the best has been accomplished. Thick cork sheathing has been laid on the floors, and this is then covered with heavy linoleum.

Steel-framed seats are arranged throughout, and they are reversible.

The cars have a length of 61 feet 4 inches over head-stock, and an extreme width of 10 feet 4 inches.

The livery adopted for the external painting is Tuscan red for the body up to the windows, with russet for window frames, and for pannelling above the doors and corner pillars. Externally, the roofs are grey, but white enamel is utilized for the interior painting up to the window sills, beyond them cream enamel



2-8-2 Locomotive Constructed by Messrs. Nasmyth Wilson, England

Adapting Old Rolling Stock

Following on the practice of British railways who have gone over to electric traction for suburban lines, the New South Wales Government railways have converted many of their steam-hauled coaches for the new services.

Thus, no less than 150 bogie cars built rather more than ten years ago for steam-hauled suburban trains, have been dealt with. These are bogie cars upon cantilever frames. These cars have been taken in hand, and practically reconstructed, the main feature being their widening to the utmost dimensions quoted above for the new stock. As originally built the width was 8 feet 10 inches, so that a substantial gain in accommodation is obtained, a net increase of seating being 8 per car, that is 68 in all. Other re-arrangements have been made in the doors, etc., to fit them for the electric services.

The widening of the frames was accomplished by adding brackets to the main solebars; these were welded. In addition, extension pieces had to be fixed on to the headstocks, with additional panels added at each of the end doors to make up for the extra width. Sliding doors were also introduced at suitable positions, the sides of the cars being cut into to allow of this. The roof did not present quite such a problem as would appear, indeed, much of it remains, extension pieces being added at the outer ends of the framing.

The bogies run unaltered, and at the time the conversion was made, the original state gas lighting was left, but as the re-built stock is added to the new electric motor cars, to form trailers, they will be given electric lighting.

A great feature in the re-construction has been the comparatively small increase of weight involved. Weighing 20 tons as built, the re-constructed cars are less than 22 tons in their later form.

The make-up of the new trains is interesting, the standard being one motor coach and one trailer; but, when the rush of traffic warrants increased accommodation, then the trains are linked up by combining two, three, and even four units, the latter making a long train of 8 coaches.

The new trains are at work upon the Illawarra-Bankstown services, and the total electric stock is sufficient to make up 37½ eight-car trains.

The control is on the electric-pneumatic system, and is provided with eight steps in the series, and five in the parallel. The trolley wire voltage is 1,500 D.C., but the switches, etc., in the driver's compartment carry only 36 volts, so that comparative safety is found in handling. The controller is fitted with a "dead man's handle," which cuts off the power automatically, and applies brakes should the driver release the handle, or even reduce his pressure upon it.

A clever arrangement also adds to the safety of train working. Control cannot be obtained on any motor coach until the train pipe is carrying sufficient air for braking purposes. Certain safety devices are added which makes the whole as near foolproof as can be.

Each train unit is driven by axle-hung motors, two in number, which develop 720 horse-power, the two 360 horse-power motors being geared to the axle.

To provide for possible failure in lighting, a special battery is carried under each motor, and this ensures a certain number of lights should the motor generator develop a fault. The rest of the lights are automatically disconnected in the event of the motor generator going out of action.

It should be added that the Chief Mechanical Engineer of the New South Wales Railways administration, Mr. E. E. Lucy is responsible for the carrying out of this portion of the electrification scheme.

Siam State Railway

Turning to Siam, we note the addition of some superb coaching stock for the Royal State Railways of that country.

Rarely has a finer saloon left these shores than the one supplied for the use of Royalty travelling upon the State Railways. A day saloon was specially designed and constructed in 1915. This splendid coach gave such satisfaction, that the Commissioner-General of the State Railways, H. R. H. Prince Purachatra, ordered another unit, which, whilst conforming to the exterior of the earlier built coach really forms a complement to that vehicle. The vehicle built in 1915 was for day use; now it was desired that a companion coach should be available for night journeys.

Hence the order to Messrs. Craven's Railway Carriage and Wagon Co. of Sheffield. The railways of Siam are laid out upon the meter gauge, therefore considerable ingenuity had to be exercised in getting ample accommodation in the coach, the lay-out comprising two complete suites. These are made up of three compartments each; a bed-room, dressing-room and bath-room being provided in each suite. The building of the car was supervised by the agents of the Royal State Railways, Messrs. C. P. Sandberg, of London.

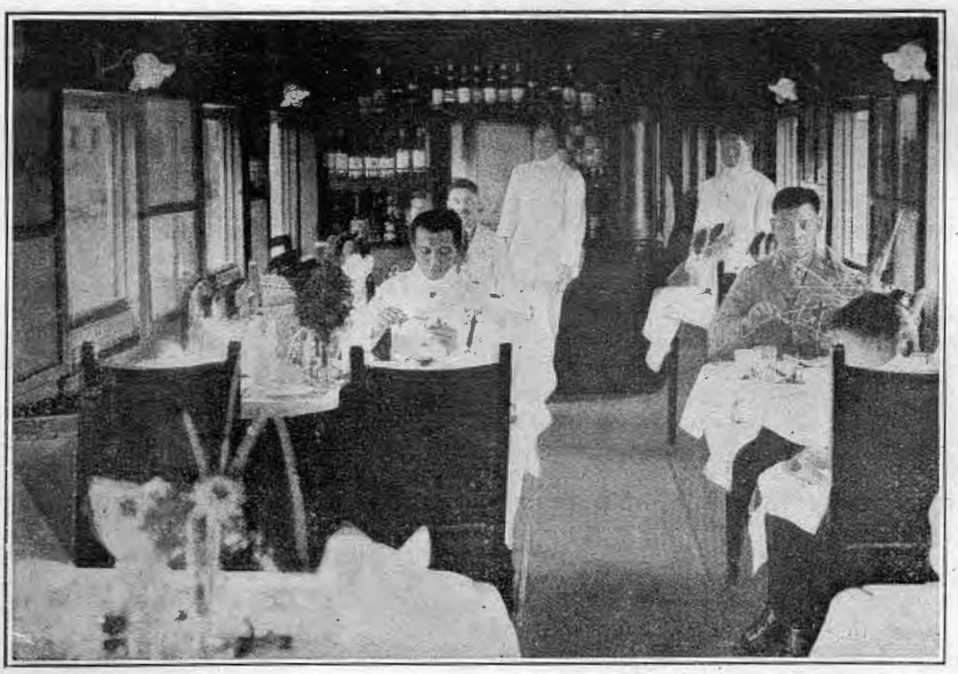
The illustration of the beautifully proportioned coach shows a central entrance, and this forms a corridor from side to side, giving access right and left to either suite. Hand rails and steps are provided in order that access to the car may be had from rail level should the train not run along-side a platform.

The two suites, though planned on similar lines, have this difference. The principal suite has the rooms, stretching right across the vehicle, the dressing-room being entered from the corridor, then bed-room is reached, and finally the bath-room. On the other side of the coach, the suite has a side corridor so that each room is available without having to pass through another, but necessarily the apartments are considerably less in dimensions. The corridor is necessary to link up with the Day Saloon, which has the usual collapsible covered gangway connection. There is also an emergency exit at the other end of this new saloon, and it is so arranged that, if need be, another car can be coupled up and a covered gangway provided, the latter being on the car which would be attached.

The automatic vacuum brake is used, and it is also adapted for use for passenger communication. Electric fittings are arranged throughout, and these comprise the usual electric lighting apparatus and bell installation.

The body framing is of teak, but the exterior panels are of steel sheeting, whilst the body is insulated from the under-frame by rubber cushions of the latest design. Frameless-balanced glass windows are installed, and then teak louvre frames, covered with copper-wire gauze are added for ventilation purposes. All frames are provided with a locking apparatus, which can be operated only from the inside, and so get rid of nuisance which has been found in previous fittings.

The elliptical roof is also of special design, the main feature extractors in the roof are relied upon, but their work is aided by ceiling fans, and also by portable bracket



Inside a State Railway Restaurant Car

Engineering Notes

Coal Mine at Kwankai.—A coal mine has been discovered at Kungkow Kwankai, Kirin province. Chiang Kwang-chiu and others have obtained permission from the provincial authorities to operate the mine with a capital of $30,000.

Fushun Coal Output.—The output of the Fushun coal mines during the second quarter of this year amounted to 1,030,000 tons, showing an increase of 120,000 tons in comparison with that of the corresponding period of last year. Of the 1,030,000 tons 549,000 tons were exported to Japan, and 480 ,000 to other foreign countries.

C. E. R. To Instal Radio Receiving Sets.—According to Harbin reports, the Chinese Eastern Railway Co. has decided to instal radio receiving sets in the residences of the more important staff members and directors, as well as in the offices of the railway administration. Altogether 35 sets of the 6 tube type have been ordered. The installation will be gradually extended to other quarters in the near future.

Gold in Heilungkiang.—The production of gold by the Feng Yuan Company and the Hsing An Company which has contributed greatly to the prosperity of Aigun in the past few years, has greatly fallen off. To a large extent this may be attributed to the difficulty in getting workmen, as the conditions of pay and living at the mines are not sufficient to attract them to this remote frontier region. It may be surmised, however, that were the deposits rich enough, means could be found to bring more workmen here. Practically the only movements of treasure during the past year were in the form of gold from the mines, and that passing through the Customs (probably only a small proportion finding its way out of the port) for the years 1925 and 1926 amounted to the respective amounts of Hk. Tls. 2,728,234 and Hk. Tls. 1,060,093.

Electric Lighting Shows Big Growth.—Although Government figures are somewhat old and out of date, they are of interest for the broad outline they give of industrial conditions in this country. Concerning the electric industry in this country the Imperial Ministry of Industry and Commerce publishes statistics which show the following use of power in factories having five or more workmen in the six leading industrial centres of Tokyo, Osaka, Kyoto, Kanagawa Aichi Prefecture (Nagoya), and Hyogo Prefecture (Kobe).

Industries :	1919	1921	1923
Using steam, gas, oil and Japanese direct connected water wheels	253,713	197,843	190,964
	h.p.	h.p.	h.p.
Electric Motors :	520,491	564,532	585,504

The use of electric power in factories would be even more emphasized if the figures for the last few years were available.

The extended use of electric light in Japan accounts for the great increase in the capital invested in the electric power generating industry the last few years. In 1920 the total capital investment was distributed : Chemical industry Y.1,200,000,000 : Mining Industry : Y.4,400,000,000 : Machinery Manufacturing Y.900,000,000 : Electric Power Generating Industry : Y.1,300,000,000.

At the end of 1925 these figures had changed so that the electric power industry stood at the head of the list : Y.2,900,000,000 : Mining industry : Y.1,400,000,000 : Chemical industry, Y.1,300,-000,000 : Machinery manufacturing industry, Y.1,000,000,000.

For a very considerable time it has been a well known fact that the electric power companies were about the only ones in Japan which could readily obtain needed financing both from the banks and the general investing public, which is not large. Power company dividends are rarely under 9 per cent. while many formerly first-class dividend payers, in which class only those companies able to pay over 10 or 12 per cent. were included, have fallen into difficulties and term after term of business has seen the dividend passed, or squeezed out by methods of finance which to say the least might be called invidious.

Wage Increases.—In view of the increasingly high cost of living in Shanghai and elsewhere, the Shanghai-Nanking Railway authorities increased the wages of the railway laborers from $10 and $12 to $15, effective July 1, 1927. Likewise, the workers at the 45 lantern shops in Shanghai recently obtained a 20 to 30 per cent. increase in wages as the result of their joint demand to their employers for an increase. Their former wages ranged from $5.00 to $8.00 per month.

Electric Merger Problem.—Japanese newspapers and periodicals are filled with speculation regarding the merger of Tokyo Electric Light and Tokyo Electric Power. A plan has been drafted by Ichizo Kobayashi, who recently joined the directorate of Tokyo Light with Baron Seinosuke Goh and Mr. Ohashi. This is to be submitted to Mr. Seihin Ikeda, senior managing director of the Mitsui Bank, who is to be the intermediary between the two companies.

Two problems await solution. The first involves the number of directors and officials which Tokyo Power will be given in Tokyo Light after the merger. The second involves the share ratio for the merger.

Tokyo Power chiefs insist that Mr. Yasuzaemon Matsunaga, now its vice-president, be given the same position in Tokyo Light and that Managing Director Shindo be made business manager. Tokyo Light chiefs are opposed to either step. They would make Mr. Matsunaga a mere director. Mr. Shindo they do not want.

Tokyo Power insists that the merger should be consummated on the basis of 10 of its shares to 11 or 12 Tokyo Light Shares. Tokyo Light, on the other hand, wants 12 or 13 Tokyo Power shares for 10 Tokyo Light shares. No formula has been evolved.

Reports of the two companies for the last five terms follow :

TOKYO ELECTRIC LIGHT

(000 yen omitted)

	Paid-up capital	Plant assets	Profit
1st half, 1925	228,650	315,685	15,363
2nd half, 1925	266,962	404,271	15,793
1st half, 1926	345,535	526,245	19,207
2nd half, 1926	345,691	540,508	19,267
1st half, 1927	345,698	559,069	19,101

	Radio of profit to paid-up capital per cent.	Ratio or profit to plant assets per cent.	Dividend rate per cent.
1st half, 1925	13.5	9.8	11.0
2nd half, 1925	11.8	7.8	11.0
1st half, 1926	11.1	7.3	11.0
2nd half, 1926	11.1	7.1	9.0
1st, half 1927	11.5	6.8	9.0

TOKYO ELECTRIC POWER

	Paid-up capital	Plant assets	Profit
1st half, 1925	28,000	63,725	1,392
2nd half, 1925	28,000	69,544	1,463
1st half, 1926	39,750	83,346	1,966
2nd half, 1926	51,500	116,766	2,677
1st half, 1927	68,217	135,135	3,070

	Radio of profit to paid-up capital per cent.	Ratio or profit to plant assets per cent.	Dividend rate per cent.
1st half, 1925	9.9	4.4	8.0
2nd half, 1925	10.4	4.2	8.2
1st half, 1926	9.9	4.7	9.0
2nd half, 1926	10.4	4.6	9.0
1st half, 1927	9.0	4.6	8.0

Tientu Railway.—The Tientu Railway had a bad year in 1926. The uncertain performance of the engines and the poor condition of the rolling-stock suggest a need of repairs and replacements on a large scale; but funds are lacking and little can be done in this direction for the present. The bridge over the Tumen now being built at K'aishant'un will enable through loading between Lungchingtsun and Kainei, and this should improve the company's business. The increase in both pack-animals and carts reporting to the Customs is very considerable. During the busy season cart transport, though more expensive than railway transport, was generally preferred by importers as being quicker and more reliable. —*Hungchun Customs Report*, 1926.

Celluloid Manufacture in China.—The Yung Woo Company is the pioneer of celluloid manufacturers in Shanghai. It was first established in December, 1927, to manufacture cosmetics, which are sold under the trade mark of "The Goddess of the Moon" with an initial capital of $50,000. Later, in January, 1926, the company erected at a cost of $80,000 a factory covering 7 *mow* of land at Kung Hsing Chiao, West Pao Hsing Road, Chapei, Shanghai, for the sole purpose of manufacturing celluloid. It employs 40 workers and produces an average of 150 pounds of celluloid a day, sold from $1.50 to $2.50 per pound. It maintains three departments: spectacle frames department, which is equipped with three machines and manufactures spectacle frames of imitation tortoise shell; toy department, which is equipped with four machines and manufactures all kinds of celluloid toys; and the ornament department, which is equipped with five machines and manufactures celluloid caskets, boxes, and chests of all sizes and shapes for decorative purposes. The company is planning to produce motion picture films. The sales office is located at Tsai Shen Lung, Min Chu Chieh, Old North Gate, Shanghai. The general manager is Yeh Chung-t'ing.

Kanegafuchi Colony.—The proposed plan for the colonization of Brazil by the Kanegafuchi Spinning Company is making headway, according to a report submitted by Mr. Hachiro Fukuhara, director of the company, who personally inspected that country in 1925 in connection with this scheme. The company spent Y.80,000, in investigation. The Para State Government of Brazil has offered free of charge a large tract of land on condition that the company undertakes colonization there. Of this, 800,000 chobu, or about 2,000,000 acres, is to be cultivated. Hospitals, schools and other buildings are to be erected. This enterprise will cost about Y.10,000,000. It is undecided yet whether the new colonization company is to be capitalized at Y.10,000,000, fully paid-up, or Y.40,000,000, a quarter paid up.

Mr. Sanji Muto, president of the Kanegafuchi interests, said that the proposed enterprise was not initiated by his company but, as is it important for the country, the Kanegafuchi authorities intend to push the plan. The contract signed by the Para State Government will have to be fulfilled before next October, Mr. Muto continued, but if the new company cannot be incorportated, the extension of the term of contract is to be negotiated to the Kanegafuchi Spinning Company through the Foreign Office. Mr. Muto asserted that he has no idea of receiving a subsidy from the Japanese Government and that a dividend of 10 per cent. or so can be declared on the completion of this plan.

New Construction in Manchuria.—With a view to stimulating contracts for railway construction in the Province of Kirin, the Chinese and Japanese subjects resident in that province have opened a railway engineering works in Kirin with a capital of Y.10,000,000, one-quarter of which was paid up on the inauguration of the company on December 21, 1926.

A syndicate has been formed in Fengtien Province with the object of building a light railway from Fuchou to Kaifeng, a distance of about 60 miles, so as to facilitate the transportation of salt. Permission has already been obtained from the authorities, and it is reported that construction work will be started immediately.

The Mukden-Hailung Railway has now been opened as far as Tsingyuan. The whole line is over 150 miles in length, and traverses mountainous regions involving the construction of two tunnels, 142 bridges and over 130 culverts. The major portion of this work has been completed, and it is expected that the whole line will be open to traffic within two or three months.

It has been definitely decided to construct a railway from Hailung, the terminus of the Mukden-Hailung Railway now under construction, to Kirin, which is now the terminus of the Kirin-Changchun Railway, and which will be the terminus of the Kirin-Tunghwa Railway, also now under construction.

Chinese Eastern Railway.

The Chinese Eastern Railway carried 256,000,000 poods of freight and 3,250,000 passengers in 1926, as compared with 207,000,000 poods of freight and 2,454,000 passengers in the previous year. A pood is the Russian equivalent of 36-lb.

Emigrant Traffic.

The emigration of Shantung and Chihli coolies to North Manchuria, as reported in my previous letter, has been stopped by the Manchurian authorities, who contend that these coolies might be used in military operations on the part of Soviet Russia against Manchuria. It is estimated that 500 coolies a day passed into Siberia prior to the enforcement of the emigration restrictions.

Purging the Chinese Eastern Railway of Communists.

The Chinese authorities in Manchuria are extremely incensed at the recent disclosure of arms and incriminating literature in the Soviet Legation at Peking, and it is predicted that Marshal Chang Tso-lin will seize the Chinese Eastern Railway and eject the Soviet representatives. The departments under the control of the Soviets have long been used for propaganda purposes, and communistic principles have been taught in the railway schools. With the object of paralysing the service in case the Chinese authorities proceed with the above intention those in charge of fuel stations have reduced the fuel supplies to a minimum.

Increase of Rates and Fares on Kiaochow-Tsinan Line.

Owing to financial difficulties consequent on the continual civil war, the Kiaochow-Tsinan Railway has, with the joint approval of the Shantung Military and Civil Governors and the Ministry of Communications, enforced as from May 1 an increase of 30 per cent. on passenger fares and 20 per cent. on goods rates.

The Shanghai-Nanking Line is also contemplating an increase in rates and fares for the same reason.

Peking-Hankow Railway.

The Northern Section of the Peking-Hankow line has been so much improved within the last few months of Fengtien Administration that it can now cover expenses, and in spite of the heavy military transportation, has at its disposal some 350 to 400 wagons. The repairs to the damaged Yellow River Bridge, the laying of a new stretch of track at points where serious derailments have been brought about by military sabotage, and the repairs to the telegraphic and telephonic lines, have all been completed.

Rolling-stock on the Government Railways.

According to statistics compiled by the Ministry of Communications, the Tientsin-Pukow line originally had 385 passenger cars, 2,088 wagons and 136 engines, of which 100 passenger cars and 539 wagons have been taken to other lines, while a number of other railways' cars have been transferred to this line.

The Peking-Mukden Railway originally had 364 passenger cars, 4,412 wagons and 236 engines, out of which 176 passenger cars, 2,759 wagons and 52 engines have been transferred to other railways, while a number of cars belonging to other railways are now running on the Peking-Mukden line. Taken as a whole, however, the amount of rolling-stock on both lines has been considerably reduced as a result of military operations.

Return of Armoured Cars to the Tientsin-Pukow Line.

The armoured cars which were recently ferried across the Yangtze River at Nanking from the Tientsin-Pukow line to the Shanghai-Nanking line by the Northerners were all captured by the Nationalists and are now being returned to the Tientsin-Pukow line to assist the latter against the retreating Northerners. An effort has been made by the Nationalists to arrange for the transfer of Shanghai-Nanking line engines and rolling-stock to the Tientsin-Pukow line, but in view of the fact that the whole property of the Shanghai-Nanking line is mortgaged to British interests as security on the loan, the railway authorities cannot see their way to accommodating the Nationalists.

Toho.—The Toho Denryoku K.K. is to purchase one 5,000-kw synchronous advancer for its Kyushu transmission system.

Hokkaido.—The Electric Light Co. is to install a new 3,000-kw turbo-alternator, switchgear and transformers at a cost of about 400,000 yen.

Mukden-Hailung Railway Opens for Traffic.—The newly built railway from Mukden to Hailung Fengtien province, was opened for traffic on September 3.

Nan Chi Steamship Co. Approved.—The Nan Chi Steamship Company organised by the oversea Chinese in Peru has been approved by the Ministry of Communications.

Kizu-gawa.—Work on the new generating station of the Ujigawa Electric Co. is progressing satisfactorily, and it is expected that the first of the two 30,000-kw generators will be put in operation in August.

Chung Hsin Coal Mining Co. Suspends Operation.—The Chung Hsin Coal Mining Company at Lincheng, Shantung province, has suspended operations. All emplyees were given three months' pay in lieu of notice.

Underground Cables Planned.—A decision has been reached by the directors of the Peking Electric Light Co., Ltd., to change all the street overhead wirings into underground cables in order to minimize danger. Work will soon commence.

Route of Ssu-Tao Railway Extension Altered.—The extension north of Taonan to Gokiol of the Ssupingchieh-Taonan Railway originally covering a distance of 350 miles is now being re-surveyed with a view to shortening the length.

Tientsin Automatic Telephone.—The Tientsin Automatic Telephone Exchange will commence operation from October 1, 1927. Subscribers with the east office and in Nos. 1 and 3 Special Areas will be privileged to use these automatic machines.

Woollen Mill in Suiyuan.—Ho Chung-yun a Shantung merchant, has raised $100,000 for the establishment of a woollen mill in Suiyuan. An application to this effect has already been addressed to the Ministry of Industries for registration.

Section of Kirin-Tunhwa Line Completed.—The construction of the first section of the Kirin-Tunhwa Railway has been completed and will be opened to traffic on and from October 1, 1927. Regulations for transportation of goods and passengers are being drafted.

Electricty Supply to Industries in Peking.—At the Shareholders' Meeting held on June 26, 1927, the Peking Electric Light Co., Ltd., decided to inaugurate a service of supplying electricity to industrial firms at a graded charge. The service will begin on and from October 1st, 1927.

Harbin-Fuyu Railway Contemplated.—To complete the railway building plan in western Manchuria, the Fengtien provincial authorities have decided to build another line between Harbin and Fuyu thus linking up with the Taonan-Fuyu branch. Survey work will be undertaken by the staff of the Ssupingchieh-Taonan Railway Administration.

New Iron and Coal Mines.—In the district of Lopei near Heiho, a new coal mine has been discovered which promises to produce coal of good quality. An iron deposit exists 300 *li* southeast of Heiho.

Taonan-Tsitsihar Railway.—It is reported that arrangements have now been made to have the Taonan-Angangchi Railway extended to Tsitsihar by an elevated track over the Chinese Eastern Railway. This settles a very sore point between the Chinese authorities and those of the Chinese Eastern Railway.

New Light Railway in Manchuria Planned.—The Chinese Chamber of Commerce and the Japanese Stock Exchange of Kungchuling Fengtien province, are raising a joint capital of $450,000 to build a light railway from Kungchuling to Itungchow a distance of 30 miles.

Shanghai-Nanking Telephone.—To facilitate intelligence between Nanking and various cities along the Shanghai-Nanking Line, the Shangahi Chinese Telelphone Company is now undertaking to construct the unfinished section of Shanghai-Nanking Long Distance Telephone Service between Wusih and Nanking. Its construction is fast approaching completion, and in early November, the service will be open to public use. The Company is also drafting the schedule of charges, and will presently submit the same to the the Ministry of Communications for approval.—*Kuo Min News Agency.*

Motor Service in Sinkiang.—News has been received by the Ministry of Communications that in order to facilitate transportation, the Sinkiang Provincial Administration has decided to establish motor transportation services at various places and has made arrangements to purchase motor trucks, lorries and buses from Soviet Russia for the service at Tacheng, and also motor cars from Tientsin for long distance travel from the provincial capital. These motor cars have already been delivered at Tacheng, but owing to the bad condition of the roads, the motor car services will not begin until repairs have been made.

Nanking Wireless.—To facilitate intelligence between the Capital and various important cities under the Nationalist control, the Military Council has ordered the installation of a Short Wave Wireless Station in the West Garden of the Council's Headquarters. The installation which had been going on for some time was completed yesterday. It is reported that although the Station is equipped with only LOO Watt's Power, it can communicate with the different Stations in Shanghai, Ningpo, Loyang, Kwangtung Amoy and as far as the Philippine Islands. Since its installation, tests have been made and the result proved highly satisfactory. It is learned that for the time being, the Station will only transmit military and political messages, but it is hoped that it may also open to commercial use in future.—*Kuo Min News Agency.*

Nationalist Government Labor Bureau.—The Nationalist Government in Nanking has started organizing a Labor Bureau with three Departments—General Affairs, Administrative, and Statistics. The first looks after the funds, documents, and other general matters of the Bureau. The second department is to take care of labor education, sanitation, and insurance, industrial accidents, arbitration in labor disputes, guidance to laborers in the organisation of unions, and making connections with foreign and international labor organisations. It has also authority to inspect factories for the enforcement of factory legislation. The third department will compile all kinds of labor statistics, conduct social research in connection with labor questions, and issue publications on these subjects. A committee has been appointed and a preparation office established to carry out the plan.

Chinese Eastern Railway.—The Chinese Eastern Railway statistics show that they carried 256 million poods of goods during 1926, as compared with 207 million poods in 1925. Year by year the traffic increases and the crops show larger figures, thus proving that the district is advancing rapidly. It has been said that the soya bean was the making of Manchuria. Since 1920 deliveries of beans from Manchuria have grown more than one and a half times, the greatest advance in bean cultivation having been made in the north within the area lying contiguous to the Chinese Eastern Railway. The territory promises to provide foreign markets with no less than 180 million poods of surplus grain produce. Not a few factors unfavorable to rural farm industry remain still to be considered, the first in importance being the extreme pressure exerted upon this industry by the increased imposition of taxes, as evidenced by the land tax itself, and dues imposed on the trade in grain. Chronic fluctuations in the exchange value of the local paper dollar have also greatly influenced the grain market, and, although during the current year depredation due to *hung-hu-tzu* has significantly decreased, it has as yet not totally disappeared.

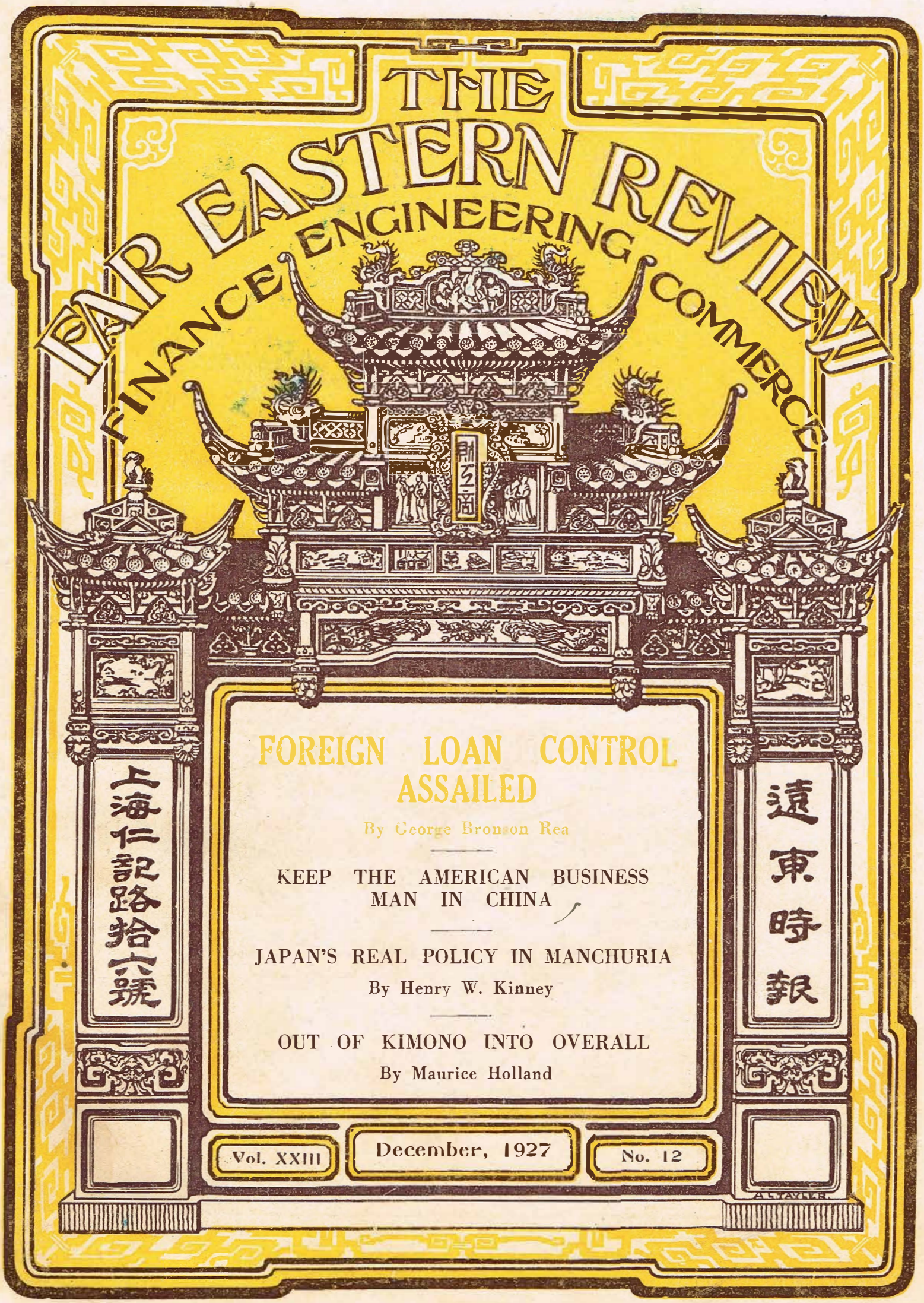
Gerald A. Chien

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

上海仁記路拾六號

遠東時報



FOREIGN LOAN CONTROL ASSAILED

By George Bronson Rea

KEEP THE AMERICAN BUSINESS MAN IN CHINA

JAPAN'S REAL POLICY IN MANCHURIA

By Henry W. Kinney

OUT OF KIMONO INTO OVERALL

By Maurice Holland

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Engineering Notes

Kirin To Wuchang Project.—Members of the local gentry at Kirin and Wuchang, Kirin province, are planning to build a railway from Kirin city to Wuchang, a distance of about 400 *li*, to facilitate the movement of agricultural produce. The project is awaiting the authorization of the Kirin authorities.

Ssupingkai-Taonan Line.—The Ssupingkai-Taonan Railway is constructing its own terminal station at Ssupingkai, with an engine she west of the Railway Town at a cost of about Yen 2,000,000. Heretofore the S.M.R. Co. Suspingkai Station has been used in common. When the new station is ready, the Railway Town of Ssupingkai will be enveloped by the Chinese Town on the east, north and west.

Taolu-Takata Light Rail Extension.—The Kaiyuan-Taolu Light Rail Line Co. (Manchuria) propose to extend the line by about 40 kilometers from Taolu (Hsifeng) to Takata (Hsian). On the 20th inst., the Directors will be called to an extraordinary session to agree on some workable plan. The extension costs are estimated at $700,000. The work will be put in hand next spring, to be finished by the following October.

Sinminfu-Mukden Section of Peking-Mukden Rly.—The Japanese loan of Y.320,000 contracted 18 years ago in connection with the Sinminfu-Mukden Railway (which is now a section of the Peking-Mukden Railway) has been fully repaid. The loan was contracted with the South Manchuria Railway Co. at 5 per cent. per annum interest, the last instalment of principal and interest having been paid by the Peking-Mukden Railway Administration on September 13 last.

Taonan-Tsitsihar Railway.—The Chinese Eastern Railway Administration, which at first strongly opposed the extension of the Taonanfu-Tsitsihar Railway from Angangki to Tsitsihar, has now withdrawn its opposition on the condition that a viaduct shall be built across the C.E.R. Construction of the additional mileage will soon be undertaken and is expected to be completed next spring. Before the construction of the viaduct there will be a motor service between Angangki and Tsitsihar.

To Double-track Peking-Mukden Railway.—The authorities of the Peking-Mukden Railway Administration are planning to double-track the line in order to facilitate traffic. Work on the whole line is to be completed by three stages, starting with the Mukden-Chinchow section, then the Chinchow-Tientsin section and finally the Tienstin-Peking section. The section of the line between Tongshan and Chinwangtao has already been double-tracked with a loan provided by the British and Chinese Corporation.

Kaitung-Fuyu Project.—The Chinese authorities who are planning to build a railway between Kaitung on the Ssupingkai-Taonan Line to Fuyu (Petune) on the Sungari have caused a surveying party of 7 sent out by the Ssupingkai-Taonan Line Office under Chief Engineer Nieh. The new route to be surveyed is 80 miles long and the surveying operations will require about a month's time to finish. Fuyu, the proposed terminus, is situated near the confluence where the two Sungaries join each other to become the Nen river, flowing near Tsitsihar. Fuyu is in the midst of a very rich country which is already growing a large amount of staple produce.

New Chichibu Cement Company Formed.—The Chichibu Cement Company has adopted a plan to establish the Second Chichibu Cement Company, capitalized at Y.7,000,000 in 140,000 shares. The first instalment of a quarter will be finished till October 20. This company is to be merged to the Chichibu Cement Company in course of next month. Money thus to be raised will be devoted to the payment of loan to the Mitsui Trust Company. The proposed plan to increase the cement production from 70,000 to 140,000 barrels has been laid aside, in view of the economic depression.

Through Shanghai-Nanking Telephone Service.—The long distance telephone system between Shanghai and Wusih is already in operation, while the section between Wusih and Nanking is nearing completion. The whole line is expected to be opened for through service early in November.

Kirin-Tunhua Railway.—The Kirin-Liutaohotzu section of the new railway being built from Kirin to Tunhua was opened to provisional traffic on October 15. The journey will take about three hours. Work on the Taoyehling tunnel is progressing and is expected to be completed about the end of October. The tunnel will be 1,820 meters long. The country traversed by the railway is regarded as suitable for rice farming on a large scale.

New Bridge at Tientsin.—A new bridge of the Scherzer type was opened at Tienstin on October 18. It crosses the Haiho near the old bridge, and has a width of 58 feet for traffic against 28 feet on the old bridge. There are special passages for ricshas. There is a free opening for river traffic of 140 feet as against 57 in the old bridge. The mobile span is worked by four electric motors of 65 h.p. each.

Tientsin-Sintsi Motor Bus Service.—The Hwa Tung Hsi Chi Motor Bus Company maintains a daily bus service between Tientsin and Sintsi, which leaves the former city at 6 a.m. at Santiao-shih, Hopei. It passes through Changhsien, Shenhsien and a number of large villages, and the fare is as follows :—Tientsin to Changhsien $2.60 ; to Tsuichwang $4.00 ; to Hwaichen $5.50 ; to Siaofan $7.00 ; to Shenhsien $9.00 ; to Kiucheng $10.00 ; to Luitow $11.00 ; to Sintsi also $11.00.

New Collieries in Hsi-an Prefecture.—A few coal mines having been discovered in Hsi-an Prefecture in the Tungshan (Eastern Hill) District, Manchuria, Generalissimo Chang Tso-lin sent an official of the name of Shou To-shan to that Prefecture last spring to look over the ground and report. At the same time, the Hsi-an Coal Mining Co. has been founded with Mr. Shou for Manager. The capital is $6,000,000. On October 5, Civil Governor Mo, Manager Ying of the Mukden Arsenal, Director Wang of the Mukden-Hailungcheng Line, Chairman Ting of the General Guild, Mukden, came together to agree upon the allocation of the capital money. By this plan, the Government will subscribe $3,000,000. $1,000,000 to be raised between the Mukden Arsenal and the Railway management, and the remaining $2,000,000 among the gentry.—*Manchuria Daily News.*

Mill for Unemployed.—To give employment to the workmen who have been thrown out in consequence of the recent labor unrest in the province, Chekiang authorities have voted $100,000 to establish a cotton weaving mill to be known as the "Chekiang Provincial Government Mill." The mill will have a number of works, of which two will be started immediately. A number of weaving machines owned by some of the defunct silk weaving factories will be purchased and converted into cotton weaving machines. Ten thousand dollars have been ear-marked for the repairs and improvements of the premises of the two works, $80,000, for the purchase of raw materials, and $10,000, for other items of overhead expenses. The two works are expected to be opened sometime this autumn, if no unforeseen circumstances intervene.

Tokyo Ishikawajima Zosenjo.—(Ishikawajima Shipbuilding Works). During the present term the Tokyo Ishikawajima Zosenjo is at work on a 2,000 ton destroyer of the first class which is to be completed before the end of the year. Construction work on a special service ship of 1,600 tons for the Navy Department will be started some time next month. The machinery and steel material mills are fairly busy with orders for bridge materials for Tokyo City and the Department ol Railways and work is also under way on turbines for destroyer propulsion which is one of the specialties of the company. Other orders include two radio towers 750 feet (?) high for the Japan Radio Company. The automobile department is also kept busy with enough orders.

Volume XXIV

January 1928
Engineering Notes:
Tahushan-Tungliaochen Railway Constructed Construction of this line was completed on 15th. October and traffic on the line would commence in November .
Mukden-Hailung Railway to Build Branch Line. The railway planned to build a branch from the vicinity of Yingpan to Hingking, Fengtien province. A survey had already been completed.

February 1928
Three Castles Cigarettes Interesting advertisement for cigarettes featuring railways.
Recent and Current Events In Manchuria An article by writer /author Henry Kinney. Emphasis in railway development . 1 photo of author and 3 maps.
Report on the Shui Kou Shan Lead and Zinc Mine Several sketch maps and 2 small photos. The mine , located in Hunan Province, had a short 600mm gauge mine railway.
Engineering Notes:
Through Traffic Conferences. Conferences had been held in November.

March 1928
American Capital for Manchurian Railways Report about loan discussions between the South Manchuria Railway Company and U.S financier, J. P. Morgan.
The Statistical Aspect of Railway Operation Methods H. Stringer with a further article comparing the operational statistics of various overseas railways with China's.
Manchuria's New Railways Article by C. K. Moser about the construction of five new lines within Manchuria during the past two years by the Chinese government for the purpose of economic development and settlement of immigrants from the southern provinces.
Railways in China and Manchuria Short report highlighting the decrepit state the express trains had fallen into because of misuse by soldiers.

April 1928
The Subsidiary Enterprises of the Manchuria Railway Another article by H. W. Kinney. This one describes the industries and enterprises set up by the S.M.R. 3 photos.
Engineering Notes
Shanghai-Nanking & Shanghai -Ninpo Railways Financial figures, month by month, for these two railways during 1926.
Mukden-Hailungcheng Branch Extension to Linkiang. The *Manchuria Daily News* provided a discouraging account of the prospects for the proposed new Nanchamuhulo-Hsingking-Tunghwa-Linkiang branch of the Mukden-Hailungcheng Railway.

May 1928
Tsinan Account of a Clash between Sino-Japanese troops. Contains one short paragraph mentioning "Use of the Shantung Railway".

June 1928
Bethlehem Advertisement for steel products including Railway Materials.

Japan's Memorandum to the League of Nations Statement made about the collision between Japanese and Chinese troops in Tsinan. Contains one sketch map of the Shantung Railway.
Engineering News:
Junction Line for Taonan-Angangki and Tsitsihar-Angangki Railroads In order to complete the junction of these two railways, the Ministry of Communications has appointed Yu Chen-fu to negotiate with the management of the Chinese Eastern Railway as the junction line would have to cross the C.E.R.

July 1928
Chinese Colonization in Manchuria Part 2 of an earlier article spelling out the government's intention of stimulating economic activity in the region by immigration of Chinese from the south. 2 photos of the SMR scenes & I map showing settlement zones.
A New Development in Mechanical Transport in Northern Manchuria Article about the use of Holt Caterpillar tractors for logging activities in the Shito Hotze (Shitouhezi 石头河子) forestry concession granted to the Chinese Eastern Railway. The railway had constructed a 35km branch line to the concession. I photo of the branch railway line with CER Baldwin locomotive No. X 269 visible. (32 other photos not reproduced here because related only the logging work using the tractors).
Engineering Notes
Kailu-Tungliao Railway. Plans for the construction of the *Kailu-Tongliao Kailu* (开鲁- 通辽) line had been completed and surveys conducted.

August 1928
Locomotive Mechanical Stokers Advertisement for Standard Stocker Company's products, represented in Peking by their agent, Major George E. Spengler. 1 small photo of Peking-Suiyuan Railway ALCO 2-8-8-2 locomotive fitted with the stoker.
Engineering Notes
Construction of Changkiawan-Tehhwei Railway. A report that prominent businessmen of Tehhwei had convinced local authorities of the necessity for the line. (Zhangjiawan- Dehui 张家弯－德惠)
Mukden and Paiyintala Connected. Direct passenger and a mixed train services had commenced on 20th June between Mukden and Paiyintala (通辽 *Tongliao*)
The Tahushan-Tungliao Railway . Report describing the new railway which was a feeder line for the PMR -The Tahushan-Tungliao
Railway was a feeder of the Peking-Mukden line and tapped country rich in cereals, livestock, skins and hides.
Through Traffic for North China Railways. A report stating that although the long-interrupted Peking-Hankow Railway had resumed traffic, Pukow trains would have to pass along the Lung-Hai Railway to reach Peking owing to the damaged Yellow River Bridge
Kirin-Hailung Railway. Work on the Kirin-Hailung Railway was making rapid progress.

September 1928
General Plan of Communications A comprehensive report (5 pages) by Wong-Peh Chun (王伯群 Wang Boqun), Minister of Communications on the state of China's railways and plans for rehabilitation and improvements. 1 portrait.

Recent S.M.R. Development Work An unidentified visitor to Dairen describes the progress of the SMR and its development work. 4 photos including one of the interiors of the S.M.R Express observation car.
The Central Laboratory of the South Manchuria Railway A description of the SMR's laboratories and research facilities
Damage to the Tienstsin-Pukow Railway A list of estimated costs for damage caused to the railway by recent military action.
Tsitsihar-Koshan Railway A budget of $6.2 million had been allocated for building this line.

October 1928
Locomotive Mechanical Stokers Advertisement for Standard Stocker Company's products.
American Interest in Manchuria A repeat article about E. H. Harriman's earlier scheme to compel Japan to sell the South Manchuria Railway to United Sates interests.
Engineering Notes
Peking-Pukow Through Traffic Delayed. A shortage of rolling stock and engines was preventing the start of this service.
Canton-Hankow Railway. The railway comprised three sections, from Wuchang-Chuchow in Hupeh province, the southern section, from Canton to Shaokwan (*Shaoguan*) and the central section Chuchow-Shaokwan of about 200 miles was still unbuilt. The Canton government was proposing to raise $30 million dollars with a view to starting this work.
M.-H.R. to Become Purely Government Enterprise. The Mukden-Hailung Railway, which had opened to traffic, was built with $40 Million equally shared by the Fengtien provincial government and the people. It was now intended to make this purely a Government enterprise by buying up all stocks held by the public.
Through Traffic between Government Railways : The Ministry of Communications had instructed the authorities of the Peking-Mukden, Peking-Hankow, Peking-Suiyuan, Tientsin-Pukow, Kiaochow-Tsinan, Kirin-Changchun and Szepingkai-Taonan Railways to resume through traffic urgently between these lines.
Construction of Tsitsihar-Angangki Line. An agreement had been reached between the central government and provincial authorities to each contribute $400,000 for completing the railway from Angangki to Tsitsihar.

November 1928
Hoover in China, A long 10-page editorial about U.S. Presidents Hoover's connections with China. While not related directly to railways, the article is of interest because it explains Hoover's association with the K.M.A (Kailan [*Kailuan*] Mining Administration and the Chinese Engineering & Mining Co. which was the origin of China's first main line railway, eventually evolving into the P.M.R. 1 photo of Hoover.
Sun Fo's Stupendous Task – China's Railway Rehabilitation A long editorial by G.B Rea about how SunYat-sen's son, Sun Fo having been appointed the new Minister of Railways now faced the task of implementing his late father's grand railway development scheme.
The Development of Manchuria The South Manchuria Railway Company was inviting foreign investment in their subsidiary industries.
Engineering Notes
New Railways in North Manchuria. Three new railways were projected for North Manchuria.

December 1928

Pacific Type Locomotives for the Ssupingkai-Taonan Railway Photograph and description of for “Pacific” type locomotives built by the S.M.R. Workshops, Shakakou, Dairen. List of specifications.

Engineering Notes:

Light Railway to Connect Tatung and Taiyuan Plans for the construction had been completed and work was expected to commence in January 1929.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路拾六號

遠東時報

JAPAN IN MANCHURIA

By GEORGE BRONSON REA

DAYLIGHT IN THE PHILIPPINES

OUT OF KIMONO INTO OVERALL

By MAURICE HOLLAND

THE FORGOTTEN THIRD PRINCIPLE OF DR. SUN YAT-SEN

AMERICA'S DUTY TOWARDS CHINA

Vol. XXIV January, 1928 No. 1

SHANGHAI, PEKING, TOKYO AND MANILA

Tientsin-Paoti Motor Service.—The motor service between Tientsin and Paoti, Chihli province, started operation on October 11.

Shanghai-Nanking Telephone Service.—The long distance telephone service between Shanghai and Nanking has been successfully installed and operation has started since October 18.

Tientsin-Harbin Long-distance Telephone.—The authorities are planning an extension of the long-distance telephone service between Tientsin and Mukden to Kirin and further to Harbin. Construction work is expected to begin before long.

Tahushan-Tungliaochen Railway Constructed.—Construction of the Tahushan-Tungliaochen Railway was completed on October 15. Traffic on the line will be open on November 1.

Yuen Yun Steamship Co., Ltd.—The Yuen Yun Steamship Co., Ltd. with offices at No. 66 Rue Laguerre, French Concession, Shanghai, is in process of formation for the transportation of goods along the Yangtze river. It is capitalized at $500,000. The general manager is Wu Chung-lien.

Mukden-Hailung Railway to Build Branch Line.—The Mukden-Hailung Railway Administration plans to build a branch from the vicinity of Yingpan to Hingking, Fengtien province. The line is 127 *li* in length and will cost $4,000,000. Surveying work on this line has already been completed.

Lighter Company in Tientsin.—In view of the silting up of the Hai Ho some Tientsin merchants are organizing the Shen Hsing Lighter Co. for conveying cargo between Tientsin and Tangku. The company owns more than eighty lighters, registered with the local Customs House.

Commercial Aviation between China and Japan.—The Aviation Company of Kobe, Japan, has appointed a delegate to approach the Peking authorities regarding the establishment of air services between Kobe and Dairen and Kobe and Shanghai for carrying passengers and mail. The Chinese Government is reported to have agreed in principle to the terms proposed by the Japanese.

Fukubu Denki Tetsudo K.K.—License for construction of railway has been granted to the Fukubu Denki Tetsudo K.K. (Fukubu Electric Railway Co., Ltd.) for a distance of 1 mile 14 chains between Kida Mura, Asuha Gun, Fukui Prefecture and Idzushimo Machi, Fukui City, gauge 3 feet 6 inches. The cost of construction is estimated at a total of Y. 400,000.

Kuji Iron Works.—It is reported that the Kawasaki Shipbuilding Works has succeeded in manufacturing black sheets from the sponge iron made at the Kuji Iron Works and submitted to Kawasaki for experiment. The quality of the new thin sheets is said to compare favorably with European and American makes.

Factory Electrification Planned by Big Company in Osaka.—It is reported that the electrification of factories is being planned by some big manufacturing company in Osaka (name unknown) and that the company is already in negotiation with some electric power companies for joint investigation of the plan. Details are not yet known, but the project when carried out will involve 45,000 kw. of electric power, it is rumored.

Ujigawa Denki K.K.—When the new Kizugawa Steam Power Station of the Ujigawa Denki K.K. is opened, the company will shut down the Fukuzaki station, and will reduce the power purchase from Daido Denryoku K.K. to minimum amount of the contract.

At the end of the year, the demand is expected to increase, therefore the additional 60,000 kw. generated at Kizugawa will be easily sold.

Chefoo-Weihsien Motor Road.—The management of the motor road and motor bus service between Chefoo and Weihsien, Shantung province, hitherto under the control of a company organised by merchants, has been taken over by the provincial government. The company has made a handsome profit during the past few years.

Odawara Kyuko Tetsudo K.K.—(Odawara Express Railway Co., Ltd.) The double track of line between Noto and Odawara has been completed recently and will be put into operation, pending permission of the Department of Railways. This will shorten the time required between Tokyo and Odawara to 1 hour and 45 minutes which the company will gradually endeavor to shorten to 80 minutes.

Harbin Tramway Opened to Traffic.—A portion of the tramway of Harbin, one and two-thirds of a mile in length, was opened to traffic on October 10. Construction of the tramway was started six years ago by a company organized by Kirin merchants and was later taken over by the Kirin provincial government. Building of the tramway and power station and the purchase of cars has cost some seven million dollars, Kirin currency, advanced by the Yung Heng Official Bank.

Black Sheet Rolling Mill.—It is reported that equipment for a new Black Sheet Rolling Mill plamed by Mr. Etsujiro Nakayama has been ordered from the Tobata Imono K. K. (Tobata Casting Company, Ltd., after competition with Landgraf (agents for Krupp) and another foreign maker represented by Illies and Company. The equipment includes one rolling mill unit, two finishing machine units and one cold rolling unit, total capacity 15,000 tons a year. The factory is to be put into production before the end of June next year.

Fuji Denryoku K.K.—(Fuji Electric Power Co., Ltd.) Established by taking over the electric department of Fuji Gasu Boseki K.K. (Fuji Gassed Spinning Co., Ltd.), with a capital of Y.25,000,000, paid in capital Y.6,250,000, on May 26, 1927. The first six month term of the new company will close at the end of November this year.

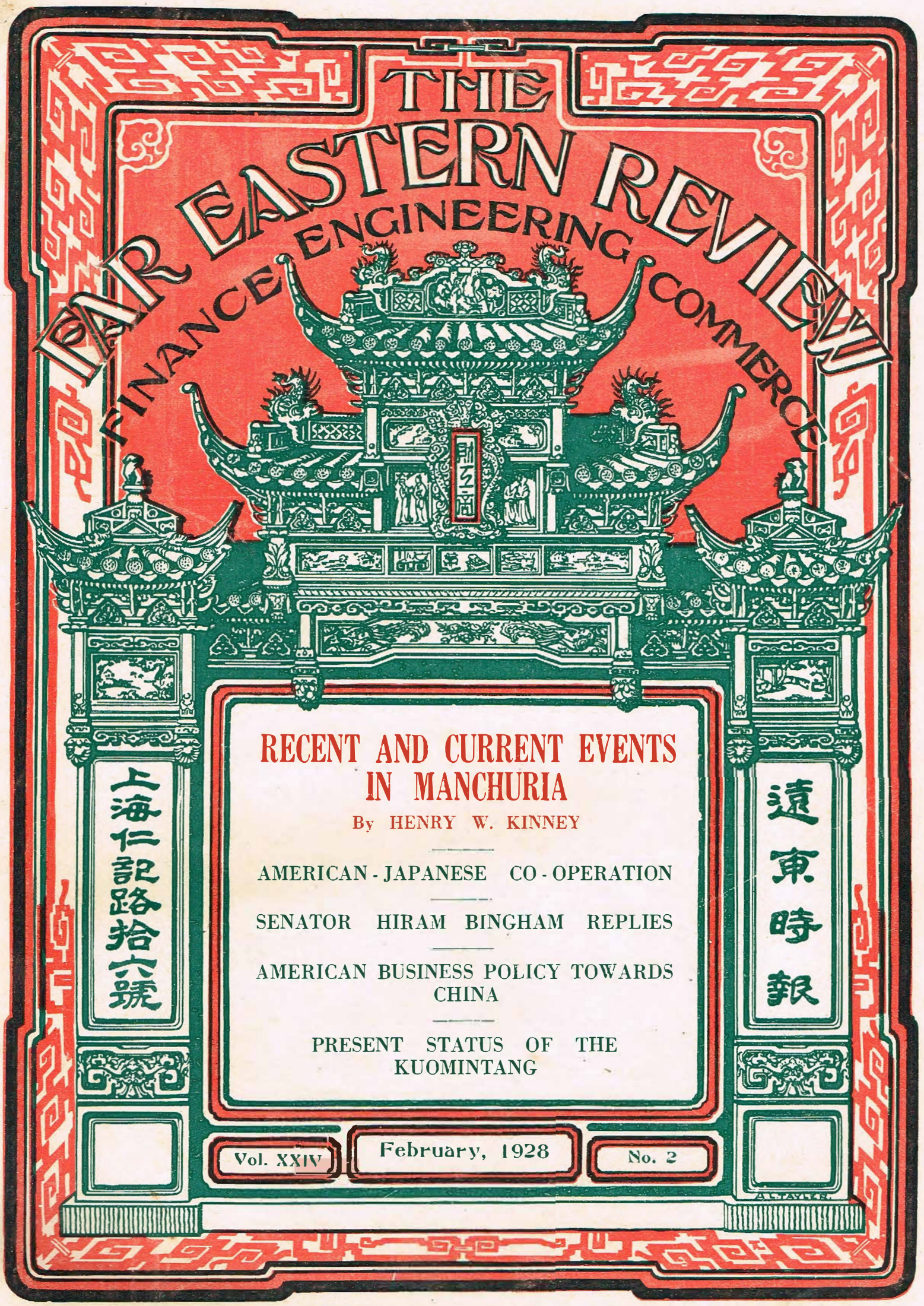
The present generating capacity of the company is as follows:

Hydro —	Urushida	1,500 kw.		
	Mine	5,000 ,,		
	Sukawa	5,250 ,,		
	Yamakita	6,450 ,,		
	Uchiyama	3,900 ,,	All located in	
	Arashi	4,300 ,,	Hakone Mountains	
	Suganuma	6,000 ,,		
		31,900 kw.		
Steam —	Hodogaya	2,000 ,,		
		33,900 kw.		

This is the rated capacity and actual amount in operation most of the time may be estimated at 25,000 kw., of which 10,000 kw. is supplied to the Fuji Gasu Boseki K.K., 5,000 kw. to Tokyo Dento, and remaining 10,000 kw. transmitted to Tokyo District to be supplied to Tamagawa Denki Tetsudo, Ajinomoto Factory, Nippon Kokan K.K. (Japan Steel Pipe Co., Ltd.), etc. Charges to Tokyo Dento are about Y.125 a kilowat a year; to Tamagawa Denki Tetsudo and others about 2 sen per kw.h.; to Fuji Gasu Boseki the rate is a little lower but profit greater as power is supplied day and night and the power stations are located in the factory compound.

The total revenues for a term may be estimated at Y.1,400,000, minus estimated expenditure of Y.350,000, balance of Y.1,050,000 profit, minus interest on loans, at 7 per cent. on the Y.19,000,000, payable to Fuji Gasu Boseki for purchase of business or Y.665,000 a term, giving a net profit balance of about Y.380,000 at the rate of 12 per cent. against the paid-in capital.

The equipment of Fuji Denryoku is estimated at Y.25, 000,000 total, including 66,000 volt transmission lines of 73 miles and distribution lines of 77 miles; electric lights installed about 10,000. The cost of one kilowat generating capacity works out at about Y.700, which is comparatively high. This was carried on the books of Fuji Gasu Boseki at Y.14,000,000, to which a profit of Y.11,000,000 was added by revaluation before the sale was effected.



RECENT AND CURRENT EVENTS IN MANCHURIA

By HENRY W. KINNEY

AMERICAN - JAPANESE CO - OPERATION

SENATOR HIRAM BINGHAM REPLIES

AMERICAN BUSINESS POLICY TOWARDS CHINA

PRESENT STATUS OF THE KUOMINTANG

Vol. XXIV | February, 1928 | No. 2

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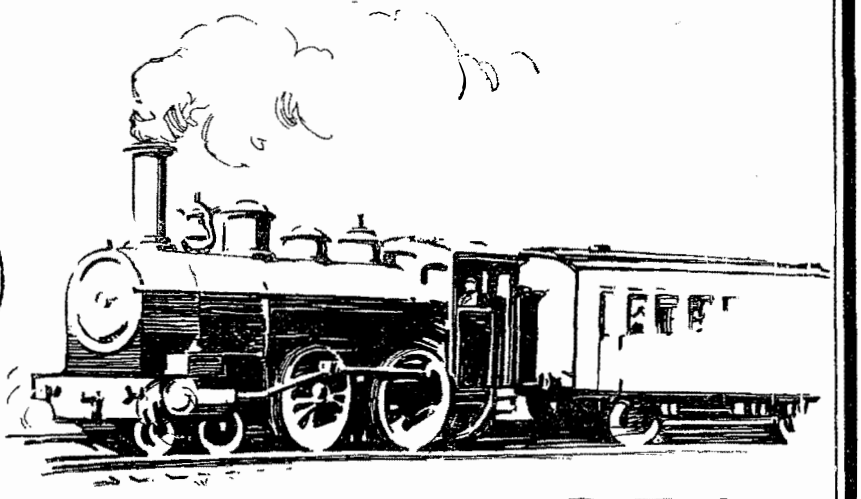
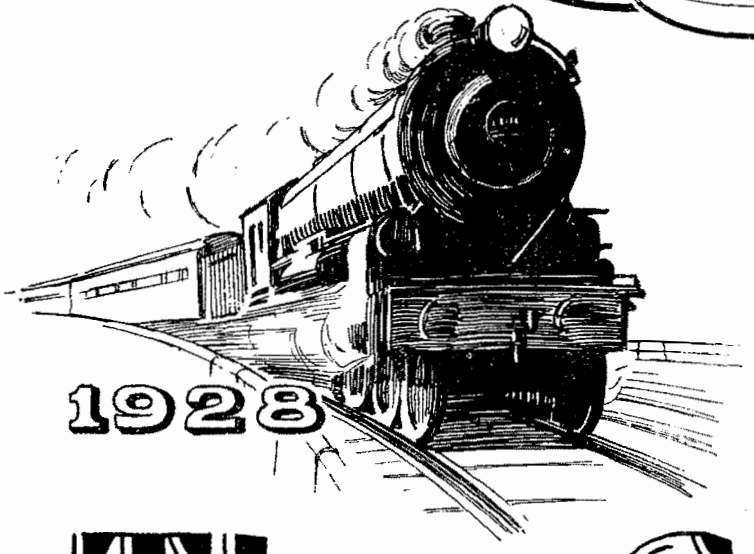


1878



1928

THE RAILWAY TRAVELLER OF 1878 HAD FEW OF THE COMFORTS THAT ARE DEMANDED TO-DAY ~~~ ~~~~~ HE COULD BE CERTAIN, HOWEVER, OF THE HIGH QUALITY OF HIS "THREE CASTLES" CIGARETTES ~~~~ AND THAT HAS NEVER CHANGED.

Three Castles

THE OLDEST BRAND OF WORLD FAME

This advertisement is issued by the British-American Tobacco Co. (China) Ltd EA 288

The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XXIV SHANGHAI, FEBRUARY, 1928 No. 2

Recent and Current Events in Manchuria*

By Henry W. Kinney

Immigration

THE year of 1927 has is several respects been an eventful one in Manchuria, but the outstanding feature thereof has undoubtedly been the tremendous increase which took place in the number of immigrants who entered the Three Eastern Provinces from the northern provinces of China Proper. For a number of years past the annual total of such immigrants had been from 300,000 to 400,000. These were almost exclusively males, about one-half or more of whom were merely seasonal laborers who returned to their home provinces in the late fall, when the harvest work had been accomplished. In the fall of 1926 a new phenomenon was observed in that, in spite of the fact that this was the season which in the past had seen no immigration into Manchuria but, on the contrary, emigration therefrom, the number of Chinese arriving continued and even increased. Furthermore, these later immigrants brought their families and chattels, coming with the determination to settle permanently in Manchuria. These people come principally from Shantung, though many also come from Chihli, Honan, and from even more distant provinces. The reasons for this exodus are almost entirely the almost impossible conditions which prevail in the original home regions of these Chinese. Shantung, which the Washington Conference hoped to see prosperous after its restoration to Chinese rule, has witnessed the greatest mass emigration of its inhabitants on record in recent history. Warfare, prevalence of banditry, excessive taxation, and famines have so harried the native population that in desparation those who can find the means to travel at all hasten to seek the benefits of peace and order and the chance for better living conditions which Manchuria offers. The number of the arrivals during the past year cannot be given exactly. They come by steamer or junk, landing at various points, while many of those from Chihli and other northern provinces come overland by train through Shanhaikwan, or walk. Most authorities agree, however, that the total for 1927 must be at least a million.

How Immigrants Settle

The vast majority of these immigrants are practically destitute and carry on their backs all their worldly possessions. Being under necessity of having to work hard and immediately to keep alive, they become producers the moment they find a place on which to settle and thus form an invaluable asset to Manchuria. Every possible care is taken to assist them, the railways giving them transportation at greatly reduced rates, while the Chinese guilds and other charitable organization assist them during the course of their migration. Unfortunately, however, many are so utterly destitute that they walk immense distances, not a few instances being recorded of such persons having walked all the way from Dairen to Harbin, a matter of about 600 miles. Great hardships and even death are suffered; still these desperate hords continue to trek persistently towards the promised lands. Even during the winter, when the frozen soil offers no opportunity for immediate occupation, they have continued to come, in spite of the fact that the Manchuria authorities had sent warnings to Shantung, advising them not to come until Spring. A tendency is also being seen of immigration from South to North Manchuria, such emigrants being usually the younger generation, whose motive is largely desire to escape the heavy taxation in Fengtien.

As most of the land in South Manchuria has already been occupied, most of these immigrants penetrate to the regions along the newly opened railways in North and East Manchuria mainly along the C.E.R. line. Many of them find employment and seek to save sufficient funds to enable them latter to take up land. Others settle immediately on lands which are placed at their disposal by the owners of vast tracts, which are cut up for such settlement. As such owners are usually high officials, they generally clear these tracts of bandits, and in some cases they have even ploughed the lands by means of tractors. This latter feature, namely employment of large scale machine farming somewhat similar to that employed in the United States and Canada, is incidentally an entirely new and probably very significant development, which seems quite successful. The immigrants are usually furnished with seed and very small sums which will enable them to carry on a frugal existence until they may harvest crops, the arrangement with the landlords being usually a crop-sharing contract. For some time past large numbers of Koreans have emigrated into Manchuria, where they engage largely in rice cultivation.

Henry W. Kinney

In paranthesis it may be noted that not a few wealthy and prominent Chinese, including ex-governors of provinces, ex-premiers and even ex-presidents of China, come to Dairen to escape from the turmoil in China. Many of them build fine houses there and are thus able from pleasant security to observe the chaos which is wracking their unhappy home-land.

New Railways

The vast impetus given immigration into Manchuria and the consequent rapid settlement of lands opened by new railway line has contributed greatly to the interest which is being taken by all

*This is a Chapter of a volume on Manchuria by Mr. Kinney which will shortly be issued. Mr. Kinney is a leading authority on Manchuria.

concerned in the development of railways in Manchuria, and this region therefore presents a striking contrast to the rest of China where railways are rapidly going to ruin and where no new construction can take place, whereas in the Three Eastern Provinces new construction and improvement of existing lines is being carried on on every hand.

The Chinchou-Pitzuwo line, a privately owned Japanese line, 63.4 miles in length, running within the Leased Territory, was opened during the past year and will develop a region which is important for its salt production and for the excellent fertility of its soil.

The Mukden-Heilungkiang line, built by Chinese with Chinese capital, was opened in the fall of 1927. It runs a distance of 145.7 miles in a north-easterly direction from Mukden and penetrates a fertile and important region.

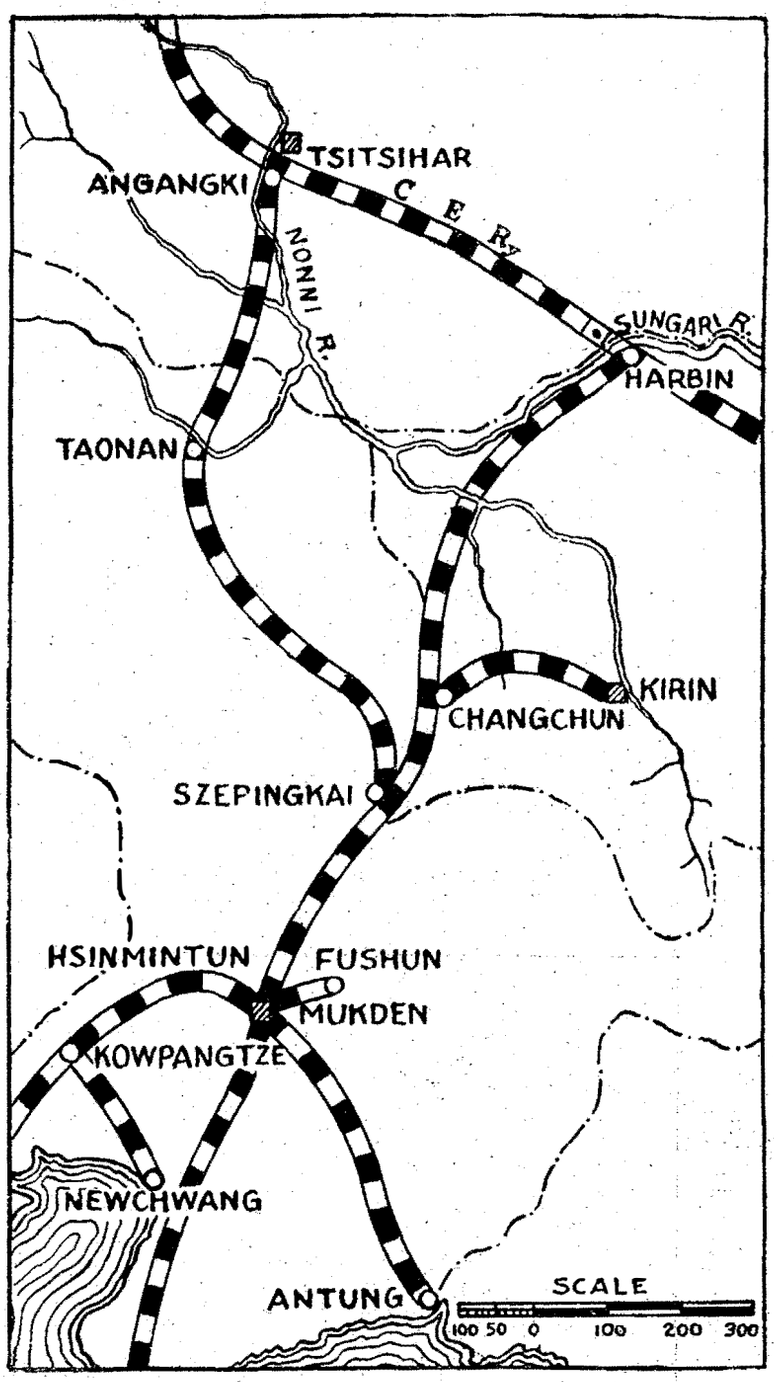
Hulan - Hailun — Chinese capital, employing a Russian engineer, built a line, 69.6 miles in length, running from Hulan (Sungpu), a point near Harbin, on the north side of the Sungari River, to Suihua. This line is to be continued, probably during 1928, to Hailun, a point 55 miles north of Suihua, when it will form the Hulan-Hailun railway, which will serve one of the most fertile regions in Manchuria.

The Taonan-Tsitsihar railway has entered into complete operation. This line does, as a matter of fact, not as yet penetrate to Tsitsihar, the capital of Heilungkiang Province, but only to Anganchi, a station on the Chinese Eastern Railway which the Russians for convenience call Tsitsihar. The Chinese intend to carry the line on to Tsitsihar proper, a distance of about 18 miles, which is now covered by a light railway. While the Russians have in the past objected to the crossing of the C.E.R. tracks —which the Chinese propose to effect by means of a bridge—it is understood that arrangements have been made to carry on this work during 1928. It may be noted that this will be done entirely by the Chinese with Chinese capital.

The Kirin-Tunhua line, which will extend a matter of 130.4 miles west of Kirin, is now being built for the Chinese by Japanese contractors. It has been partially completed and is to be finished by the fall of 1928. It presents a difficult piece of engineering, involving several bridges and two large and two smaller tunnels, as it penetrates a very mountainous region which is important for its timber production and as a potential producer of rice.

The Takushan-Payantala railway, running from a point on the Peking-Mukden line, about 80 miles south of Mukden, to Payantala, a town in the Mongolia-Manchuria border region, about 125 miles west of the S.M.R. main line, whence it is also reached by the Ssupingkai-Chengchiatun-Payantala railway, was completed during the fall of 1927. It was constructed by the Chinese with Chinese capital. The Kirin provincial authorities are preparing to build a railway from Kirin to Hailungchen, where it is to connect with the already constructed Mukden-Hailungchen road, thus forming a continuous line from Kirin to Mukden.

It should be noted that all the railways mentioned above have been or are being built on the 4 foot 8½ inch standard gauge, which is the same as that employed by the other Chinese and Japanese lines in Manchuria, but which differs from the Russian 5 foot gauge used by the C.E.R.



Taonan-Tsitsihar Railway

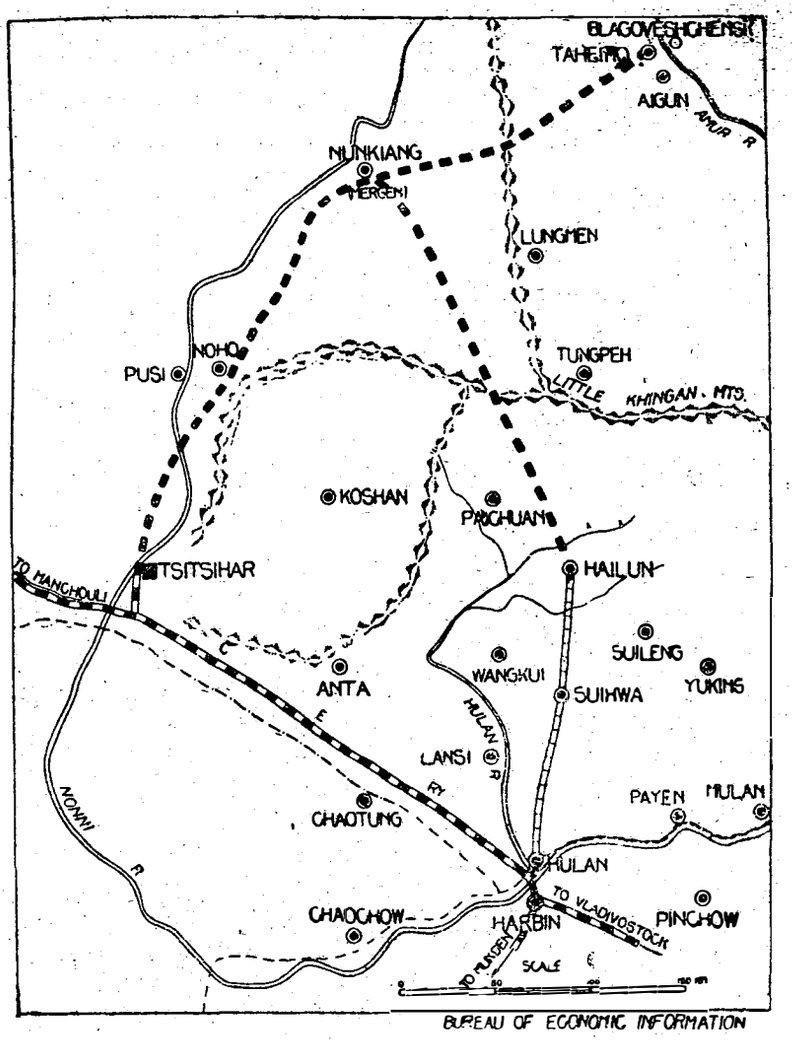
Protests and Competition Question

Railways in Manchuria, as is the case with railways elsewhere, involve economic, political and strategic considerations. Broadly speaking, it may be affirmed that all these railways have mainly economic importance, as they all serve lands which are already economically important, or open great, fertile, but as yet undeveloped regions for settlement by the great hordes of immigrant farmers which are now flocking into Manchuria. All railways are strategic in so far as all railways the world over constitute essential factors in military operations, and those in Manchuria are of strategic importance in proportion to the extent to which one regards Manchuria as a future battle field or not. While the Japanese place by far the greater emphasis on the economic development of Manchuria, which fits in with the determination of Japan to work out her future by means of industrial development, she makes no secret of the fact that in case of a war on the continent of Asia—which she sincerely hopes may never eventuate—Manchuria must form her first line of defense. Similarly, while the Chinese in the construction of their lines are interested mainly in financial gains, they have themselves avowed that they consider it important that the three provincial capitals, Mukden, Kirin and Tsitsihar, be linked by railways of their own, as will be the case if the Kirin-Hailungchen and the short strip from Anganchi to Tsitsihar are completed.

The economic feature is, however, uppermost in the minds of all those involved. The Russians, operating through their part ownership in the C.E.R., wish to see traffic carried through the port of Vladivostok. The Japanese, to whom it is important that the exports from Manchuria, of which Japan buys by far the greatest share, be carried as cheaply as possible, wish to see traffic go through Dairen—and possibly in future through some port on the Korean coast, by an extension eastwards of the Kirin-Tunhua line. The Chinese wish to see traffic carried over such lines as they have built or may build, though they are hampered through the fact that they possess no port of any consequence.

These considerations lead to the insistence of each of the parties concerned on its acquired rights and interests being observed by the

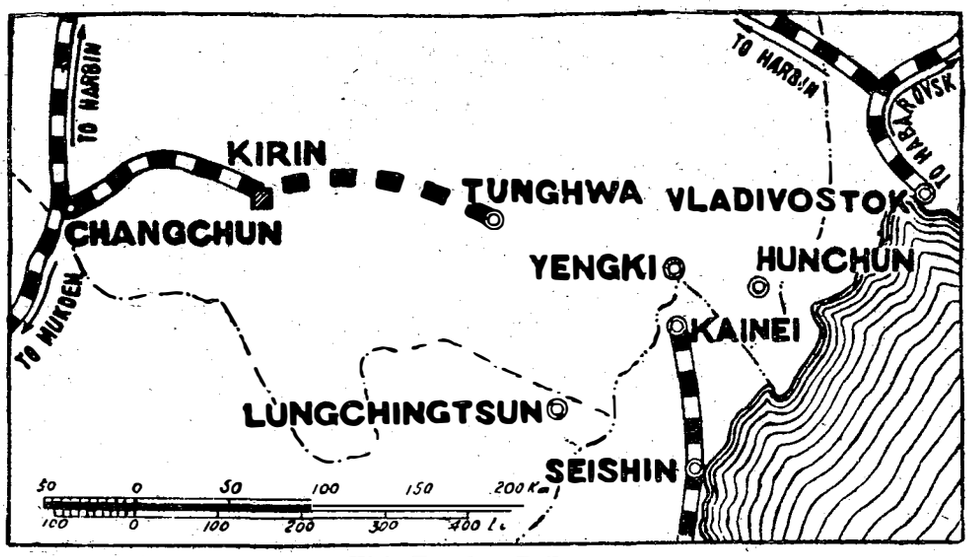
others. This point may thus be observed in the protests which Japan has made to the construction by the Chinese of the Takushan-Payantala and the proposed Kirin-Hailungchen lines. These protests are based on the Sino-Japanese agreement of 1905 and on subsequent reservations and contracts with the Chinese Government, by which the Chinese undertook to construct no lines parallel or competing with the South Manchuria Railway. The railway mentioned are in open violation of these undertakings, but it is of paramount importance to observe that the position taken by the officials of the S.M.R. is an extremely liberal one. Their point is that at this time when the Chinese are showing increasing disregard for treaties and agreements, it is essential that Japan, for one, insists on such observance, lest, by failing to do so, a dangerous precedent be established which may lead to still further violations. Once the Chinese show their willingness to admit their obligations, say these S.M.R. officials. Japan is willing to show a liberal spirit. The point of competition will be regarded as of less importance.



Hulan-Hailun Railway

Sufficient Traffic for all

In fact, the management of the S.M.R. does not regard the question of competition as vital or even of first class importance. It takes the view that, with the constant influx of immigrants and opening of new lands for cultivation, Manchuria will furnish more than sufficent traffic to keep busy the existing lines, Chinese, Sino-Russian, and Japanese, as well as those which are likely to be built. The annual freight increase handled by the S.M.R. alone has during recent years amounted to about 1,200,000 tons. In future the production of Manchuria is practically certain to increase in at least similar ratio, giving an abundance of freight to all railways. The key to the situation lies in the ports which serve as outlets for the goods carried by the railways. The Russians have Vladivostok. The Japanese have Dairen, with the cheapest cargo handling in the world, and if a line is developed to the Korean coast and a port is formed there, it must attract a huge volume of traffic from the immensily productive regions lying along the line from such port to Changchun and from the region west of that city, especially as the route by water from the Korean coast to Tsuruga is only about half as long as that from Dairen to Kobe. The point that such a port must act in competition with Dairen is met with the rejoinder that there will be more than enough business for both. The Chinese have Newchwang (Yingkou), which is also served by an S.M.R. branch line, but this port is of no great importance as it is ice-bound during the very busiest export season. Tientsin, lying a considerable distance up a shallow river, and its outport, Taku, with its mud bar, cannot handle cargo as cheaply as Dairen and are further from the world market, especially Japan which takes most of Manchuria's exports. The Chinese plan to develop a port at Hulutao, a point about half-way between Mukden and Taku. This is quite feasible, but it will be expensive, will take considerable time, and will, when completed, be able to handle little than three million tons, which cannot be a factor of much importance when one considers the constant and tremendous increase of the total production volume of Manchuria.



Kirin-Tunghua Railway

New Railway Development

Other projects for new railways in Manchuria are numerous, but they can act only as feeders to the main lines reaching the ports mentioned. All concerned, Russians, Chinese, and Japanese, have in mind projects which will serve to develop regions to feed their respective lines, but, as has been shown, the increased production which they will bring about, is bound to find its way out through the best managed lines reaching the best ports, and the Chinese population is sure to be the principal gainer by this development. The great point is that railways must be built to open lands on which the immigrating masses may settle, as without lines to serve the lands to be opened, which will carry away produce and do away with the curse of banditry which prevails where no lines exist, no settlement is possible. The Chinese have during the past few years become tremendously interested in building lines themselves, whereas in the past they had been content to have other nationals do so for them, but their lack of ample capital and credit militates against their engaging in construction of the large scale which present conditions demand. It seems therefore imperative that foreign capital be employed to co-operate with the Chinese, not only to build new lines but to improve existing lines and develop industries. These latter considerations brought about the consideration of the much discussed negotiations for a loan by the S.M.R. from bankers abroad. Briefly, for the vast scale development of Manchuria the em-

ployment of foreign capital is desirable. Foreign bankers will not loan such to the Chinese direct, as they have no means of protecting such investments. Such protection can, however, be provided where funds are furnished through the Japanese, who can furnish guarantees satisfactory to the bankers abroad. Japan is interested in Manchuria's development as these provinces can form an important factor in her own industrial development, partly by producing raw material and partly by becoming a market for Japan's manufactured goods. But, as has been shown, the Chinese are the ones who benefit the most, and it may be pointed out in this connection that such lines as have been built through Japanese loans or contracts are Chinese in ownership and are under direct charge of the Department of Communications of Peking, *both nominal and actual management being Chinese.* The same will be the case with new lines built in Manchuria.

The "Open Door"

The loan and development plans above referred to thus planned to bring about co-operation by the Chinese, Japanese, and foreign nations, the participation of the latter being a plain demonstration of Japan's desire not only to keep the "Open Door" open, but to push it still wider. The plan met with opposition by the Chinese, and this leads to consideration of another phase of the Manchurian situation which has very recently come to the fore, namely opposition by the Chinese to Japanese, as well as to other foreign development in Manchuria. This has shown itself in several ways, partly by the imposition of taxation and levies contrary to the treaties, whereby imported goods are charged more than the tariffs legally due; by driving out of Korean rice farmers, whose leases from Chinese landlords had not expired, but who were forced to abandon their homes abruptly under threat of force; by refusal, in some parts, of the authorities to recognize transfers of lands belonging to and sold by foreigners having no extraterritorial rights, where such sales were made to others than Chinese; and in other ways.

The "Positive Policy"

In matters such as these the Japanese, having by far the greatest interests, have been the most seriously affected, and opposition has been manifested in corresponding degree against them, culminating, for instance, in a demonstration against Japan which took place in Mukden during the fall of the past year. It has been reasonably well established that this, as was the case with other phases of anti-Japanese activity, was engineered by the Chinese authorities, and the explanation given has been fear of encroachment on Chinese rights by Japan's so-called "positive policy." This policy contains nothing new, consisting merely in announcement on the part of Japan of a determination to have a settlement reached in respect to many and varied outstanding questions which have been allowed to be procrastinated for many years. Undoubtedly the exaggerated fears of this policy were due to a large extent to erroneous and utterly preposterous statements made by the Japanese press shortly after the accession to power of the Cabinet of Premier Baron Tanaka in Japan. Thus it was stated that a new régime was about to be instituted by which Japan would take positive measures, making the S.M.R. practically a sort of East India Company, whose President would have the title of a consul-general and virtually conduct Japanese policy in Manchuria. These reports were officially denied, and time has shown that they were false, but they have served as a pretext on which opposition to Japanese activities may be based, although the extent and purpose of such activities remain, as they have always been, the development of Manchuria so that it may help to solve Japan's industrial problem, without any political or territorial aggression being considered.

Marshal Chang Tso-lin

Economic Drawbacks

Another important feature of the history of Manchuria during the past year has been the absence therefrom of its ruler, Chang Tso-lin, who, with his principal lieutenants, has moved to Peking to operate in the larger sphere of ruling North China, with the hope of possibly eventually uniting China. Manchuria has been fortunate in so far as actual warfare has remained far from its borders. While chaos reigns supreme in the rest of China, the Three Eastern Provinces have continued to advance, increasing in population productivity, railway mileage and various other developments in which Chinese, Japanese and other foreigners have taken part. Good crops have added to this prosperous condition. Still, Manchuria has suffered indirectly, but quite severely from China's wars. In order to meet the tremendous expenses involved in his campaigns in China Proper, it has been necessary for Chang Tso-lin to draw heavily on his prosperous home provinces. This has been done partly by various imposts and the like, such as have been described, but principally by the issuance by the provincial banks of great floods of paper money, so great that their total is unknown, and which have no, or an infinitessimally small reserve of silver to back them. With these funds the provincial banks engage in a huge and ubiquitous buying campaign, absorbing the bulk of the produce raised, which is then sold for silver, most of which must go to Peking. Private buyers have had slight chance in a competition against buyers who can print their own money as they go along, and as a consequence private business and industry has been decreased disastrously, the worst instance being that of the Mukden paper dollar, the "fengpiao," which two years ago stood at about 1½ to the yen but which now stands at about 13½ to the yen. As a consequence the buying power of the farmer's product, translated into paper dollars, decreases drastically, and import trade suffers. It is one of the best proofs of the phenomenal prosperity of Manchuria that it has not only been able to bear but has progressed under such adverse conditions. But such progress seems virtually inevitable. The vast and fertile regions continue to attract the millions of Chinese war sufferers from China Proper. The situation presented, namely a tremendous area of rich, uncultivated land, lying within a day's journey of an almost inexhaustible labor supply, is probably unprecedented in the history of the world. All that is needed to facilitate this is Chinese co-operation with foreign initiative and capital to turn the almost limitless resources of Manchuria into a refuge for the hapless masses of starving North China so that they may transform this territory into one of the richest and most important of the productive regions of the world.

Japanese Flour Mill for Changchun.—In view of the fine wheat crop in Manchuria and the growing export, the Mitsui Russan Kaisha is contemplating the establishment of a flour mill at Changchun. The 1927 crop is 20 per cent. higher than in 1926. According to estimate the yield along the southern section of the C.E.R. is 175,000 tons, for the eastern section 96,000 tons, for the western section 309,000 tons, for the Hulan-Hailun Railway 198,000 tons, for the Lower Sungari valley 221,000 tons and for other regions 17,000 tons. The price of flour at Changchun has dropped to $3.05 silver per bag.

Report on the Shui Kou Shan Lead and Zinc Mine, Hunan

By C. C. Liu, C. C. Tien and C. Y. Ou Yang

This interesting report appears in the "Bulletin of the Geological Survey of Hunan," Changsha, Hunan. Mr. Y. Y. Li is Directer of this Survey.

THE Shui Kou Shan lead and zinc mine which, up to the present time, is one of the very few metal mines in China operated by modern practice, is situated a few miles south of Siang river in the southern central part of Hunan province (see Fig. 1). It is 9.5 *li* distant from Sung Po, the loading station on the Siang river, 75 *li* from Chang Ning Hsien, 120 *li* from Heng Chow and 620 *li* from Changsha, having a latitude of 26° 40′ and a longitude of 112° 26′. The mine is well located as regard transportation facilities. A light railway with 20-lb. rail built to 60 cm. gauge, runs north from the mine to Sung Po. Between Sung Po and Heng Chow freight is usually carried by Chinese junks, but during high waters, occasionally by steam boats. From Heng Chow to Changsha steam boats are available throughout a greater part of the year except during low water season, from about November to March, when only small launches can pass.

Existing records show that the mine has been worked by the native people for the past 300 years, dating back to the end of Ming dynasty (A.D. 1600). In the close of the last century, the mine stopped operation owing to the difficulties and costs of working at depth. It was in 1897, the 23rd year of Kuang Hsu, that the mine was taken over by the Hunan Provincial Government and then the Governor of Hunan established what was called the Hunan Provincial Mining Board. Operations were re-started, but still in the most primitive way. The results obtained were disappointing and the necessity of replacing the native methods by modern practice was soon realized. In 1906, consequently, modern machinery was introduced and the mine re-organized. The present inclined shaft was sunk and a dressing plant of small capacity was built. The latter was replaced by a new plant of bigger capacity put in commision in 1912.

Topography and Geology

The topographic feature of the Shui Kou Shan district consists of two isolated hill ranges with an alluvial plain extending between. They arrange themselves after the fashion of a Chinese character "八" (eight) or a truncated Greek letter λ and are tectonically disposed with a remarkable symetry, namely a synclinal fold sharply turned towards the alluvial plain. The hill ranges rise up to an average height of about 250 meters and run nearly S-N which is also the trend of their tectonic axis. The alluvial plain which lies between them is the largest in the region surveyed, about 2.5 *li* wide by 20 *li* long, and extends northward to the Siang river. It is along this plain that a light railway was built from the mine to Sung Po.

As regard to geology it is characterized by two prominent series of sedimentary rocks, *viz.* the Silurian quartzite and the Permian limestone and coal series, which were intruded in the inner western limb of the synclinal fold by a big mass of quartz monzonite (?) and which are unconformably overlain by the red formation of probably Cretaceous in age. The quartz monzonite occurs between Shui Kou Shan and Lung Wang Shan like a laccolith in nature and forms many low hills standing in front of the main range. On the west it comes into contact with the Silurian quartzite, and the north and the southeast with the Permian limestone and coal series. The Silurian quartzite dips into the mass at an angle of 30°, and owing to its enduring nature it usually builds up the highest range of the surveyed region. So far as observed in the field, no exposure of limestone could be found, being entirely hidden underneath either the alluvium or the red formation. Through the underground work of the mine it was found that the limestone carrying the so well known lead and zinc deposits had been thoroughly metamorphosed into white marble and directly lies between the Silurian quartzite below and the siliceous shale of the Permian coal series above. The siliceous shale as exposed along the hill foot near by the Shui Kou Shan railway station is steeply inclined towards E.N.E. with a dip angle of 70°-80° and is directly overlain by the red formation which dips nearly in the same direction but at an angle of not more than 50°. The discordant contact of these two formations is quite remarkable and can be directly observed in the field. The red formation is composed of an alteration of red sandstone and shales with a total thickness not less than 1,000 meters. On a hill slope about one half *li* north of the main shaft (shaft No. 1) we found the red formation with a local massive conglomerate also un- conformably lying upon the siliceous shale. This conglomerate is chiefly composed of somewhat water-worn pebbles of white marble and grayish white quartzite set in a blood red, sandy and calcareous cement. The size of the pebbles varies greatly, ranging from 2mm. to 6cm. or more. From the largest and somewhat angular marble pebbles simple corals and *Fusulina* have been found. It then becomes evident that this conglomerate is the real basal of the red formation and derives most of its material from the underlying Permian limestone and Silurian quartzite. A section, carefully made at Shui Kou Shan as to reveal the succession of the strata in the western limb of the syclinal fold, is shown in PL. I, Sec. A-B.

At Lung Wang Shan on the south of the quartz-monzonite mass a series of whitish to redish-gray quartzose sandstone with its underlying coal-bearing series is exposed and seems to be in a fault contact with the igneous mass. These strata generally dip towards NW. with an angle gradually increasing upward from 25° to about 50°. In the upper part of the coal-bearing series we found very abundant plant fossils in a black bituminous shale but all preserved in a very poor condition.

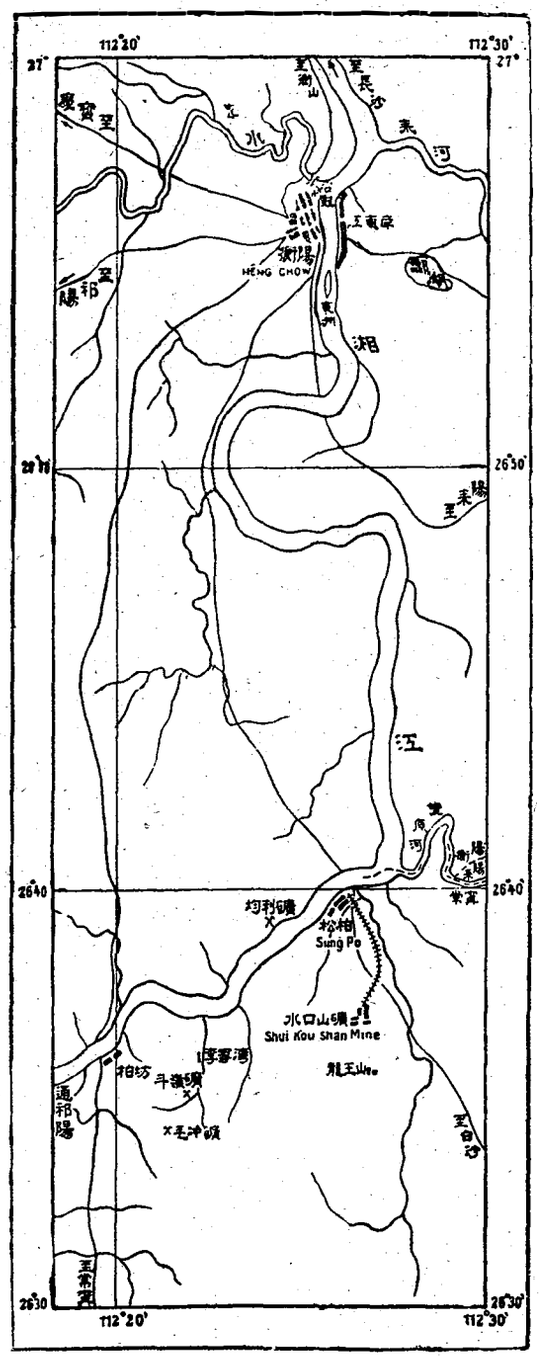


Fig. 1.—Map Showing Location of Shui Shan Mine, Scale 1: 350,000

Probably below this fossil plant bed in the same coal-bearing series at Tou Ling about 15 *li* southwest of Lung Wang Shan or 20 *li* west of Shui Kou Shan (see Fig. 1) we were fortunate in a dark calcareous shale to find *Gastrioceras zetteli*, *Gastrioceras liui* and some *Productus*. From this finding the coal series and its underlying limestone are definitely determined to be of Permian age and are most probably equivalent in horizon to the middle and lower part of the Wushan limestone at the Ichang gorge of Hupeh.

Regarding the geological age the red formation, on the basis of its lithological characters and its superposition, we refer it to the Cretaceous and correlate it with the red formation occuring in Central and South-eastern China. This formation is very widespread in the surveyed region and in many places covers the quartz monzonite, gently dipping toward E.N.E., and no metamorphic effect is indicated. So this formation appears to have not been affected by folding and metamorphism.

From the outlined character of these formations we can judge here that in the Shui Kou Shan district the date of the orogenetic movement is pre-Cretaceous, most probably during the Jurassic time, and this took place before the intrusion of the quartz monzonite.

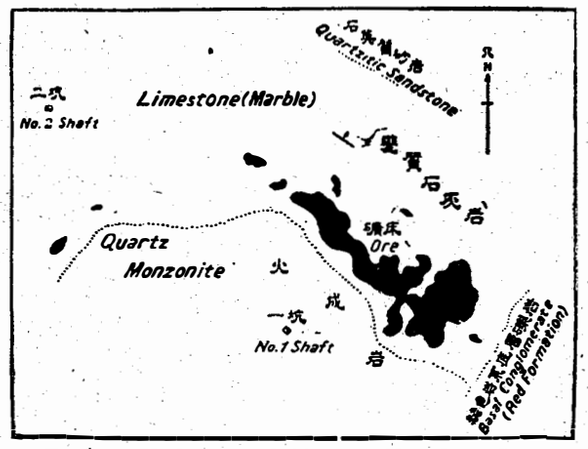


Fig. 2.—Underground Map of Shui Kou Shan, Illustrating General Distribution of Ore Bodies with Reference to the Surrounding Formations

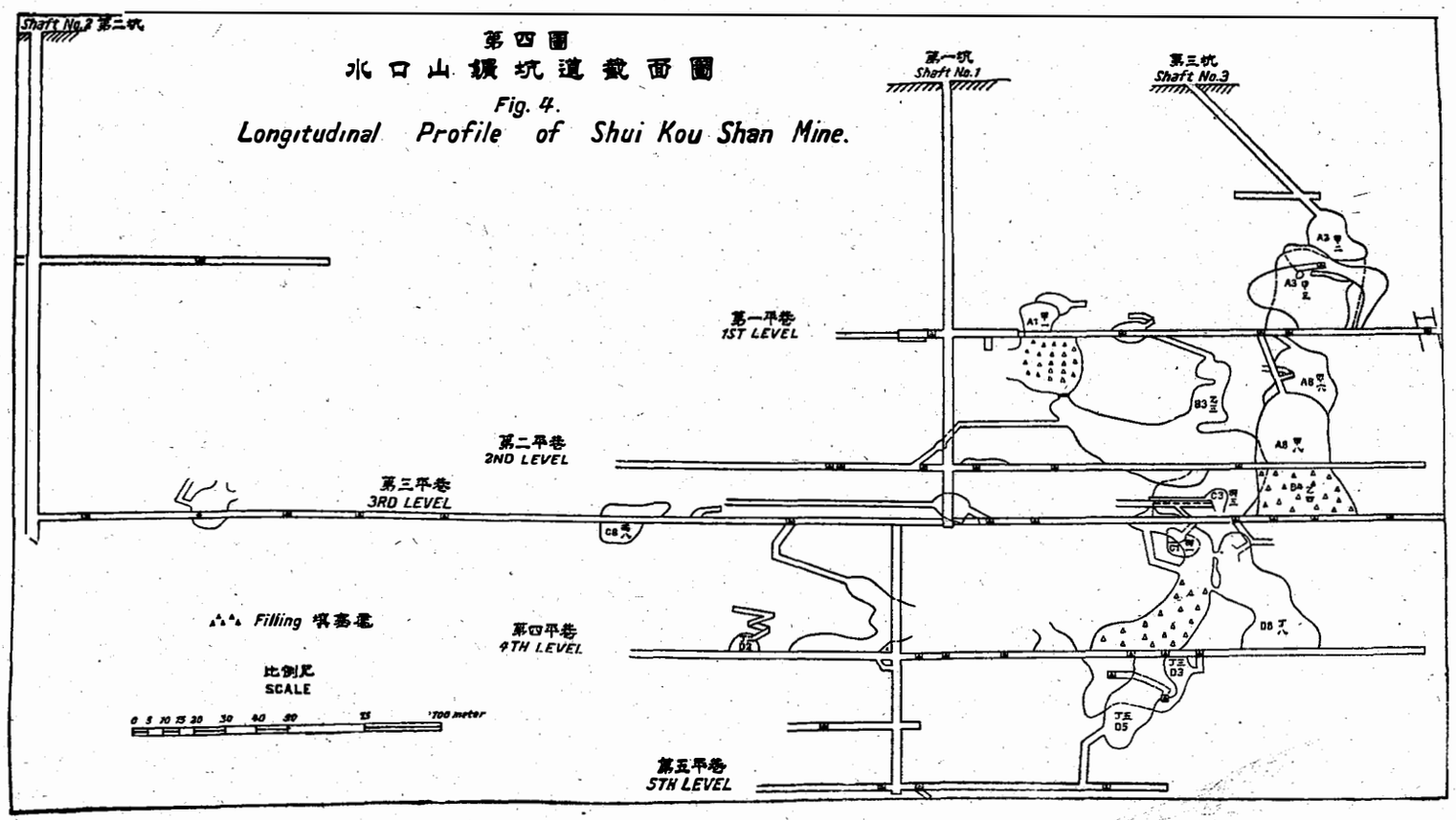
Ore Deposit

The lead and zinc deposit was developed entirely in the Permian limestone near or at the contact of the quartz monzonite, roughly following a curve from the southeast to the west (Fig. 2). The deposit usually occurs in the form of large irregular chambers or pockets, but sometimes also occurs in the form of open space veins with a symmetrically banded structure. According to the statements of the miners, up to the present, such six ore chambers have so far been found. They are all located at the depth of about 40 meters below the ground surface and most of them have been followed downward to 100 meters. Among them the largest is Chamber A 3 which lies with its large portion between the first and the second levels, and now produces the best quality of ore. The ore is composed of galena and sphalerate, in a ratio of one to two, in association with pyrite. Chalcopyrites sometimes also occur. Gangue minerals are calcite and quartz, but the latter is very rare to find. As to the high temperature minerals such as garnet, mica, magnetite and the like, characteristic of the contact metamorphic deposits, it is indeed that none of them is to occur. Except galena which has been partially altered into cerussite by secondary enrichment in the weathering zone, all the other minerals occur in primary origin and show no alteration at all. On a polished surface of a piece of the ore we found that sphalerite was more or less replaced and cut through by galena which in turn was cut through by calcite. As to pyrites they all occur in the form of small crystals embedding either in calcite or in galena and sphalerite. So the order of deposition appears to be: 1st pyrite, 2nd sphalerite, 3rd galena and 4th calcite.

As being judged from the mode of occurrence and the composition mentioned above, the deposit is evidently blong to the type of replacement and filling in connection with the quartz monzonite.

Mine Workings

The mine at present altogether has three shafts, called No. 1, No. 2, and No. 3 shaft respectively (Figs. 3 and 4). No. 1 shaft, which has three compartments and measures 11-ft. 6-in. by 6-ft. 6-in. inside timber, was sunk at an angle of 51° to a vertical depth of 480-ft., serving as the main working shaft. Three levels, the 1st, 2nd, and 3rd, 6-ft. by 6-ft. in cross-section were driven at 276, 424, and 480-ft. respectively. From the 3rd level a vertical shaft of 10-ft. by 6-ft. 6-in. inside timber was sunk to a depth of 260-ft. below it, which serves the 4th and 5th levels driven at 624 and 740-ft. from surface respectively. The 5th level is the lowest and only little work has been done there on account of the low grade of the ore.



A Conspicuous Iron Hat at the Front of Lung Wang Shan

Polished Specimen of Zine-lead Ore from Shui Kou Shan Mine, Showing the Association of Sphalerite (S), Galena (G), Pyrite (P) and Calcite (C)

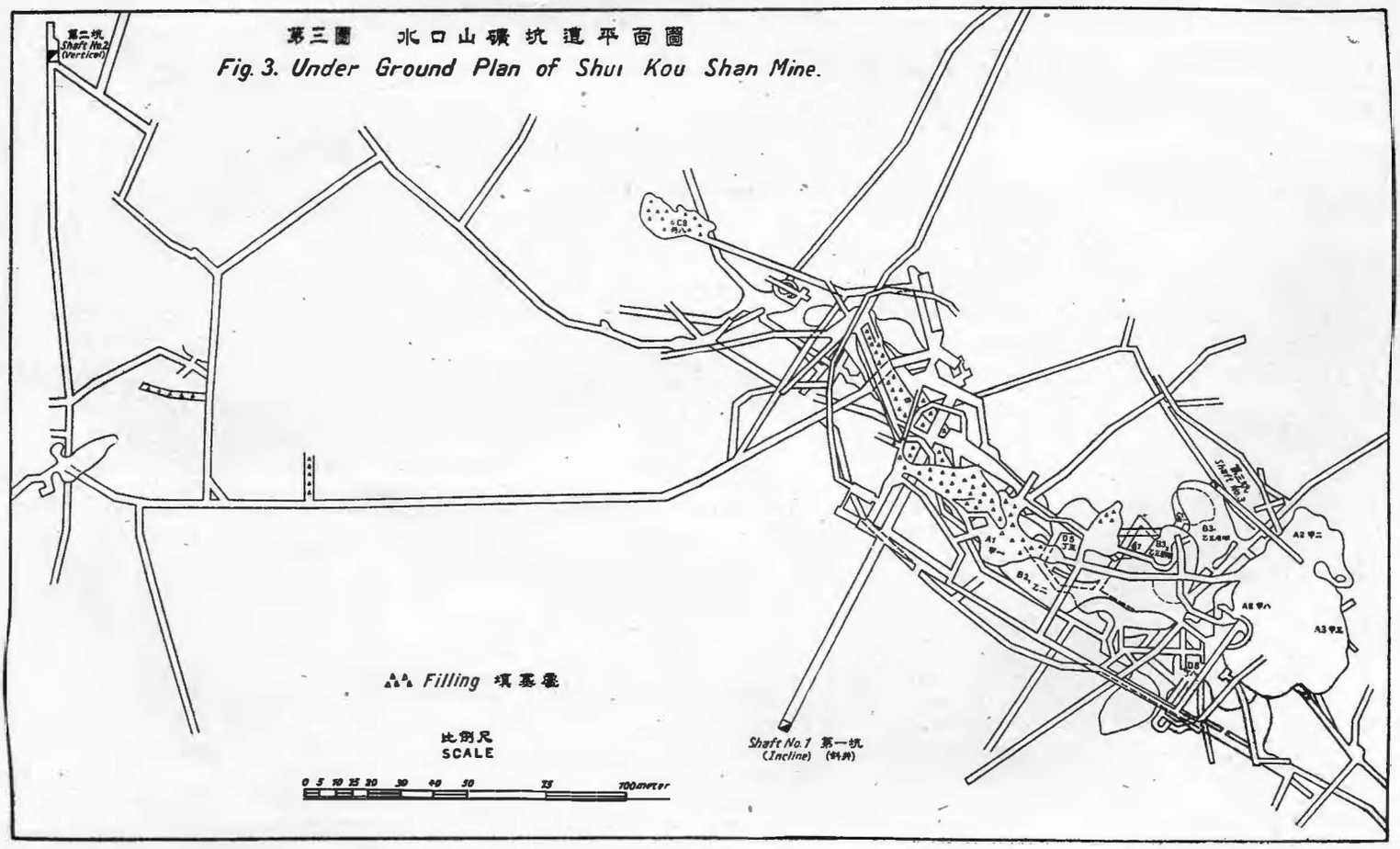
No. 2 shaft is vertical, having a cross section of 13-ft. 9-in. by 6-ft. 6-in. and a depth of 480-ft., thus connecting the 3rd level. It is provided with three compartments, two for hoisting and one for pump and ladder way.

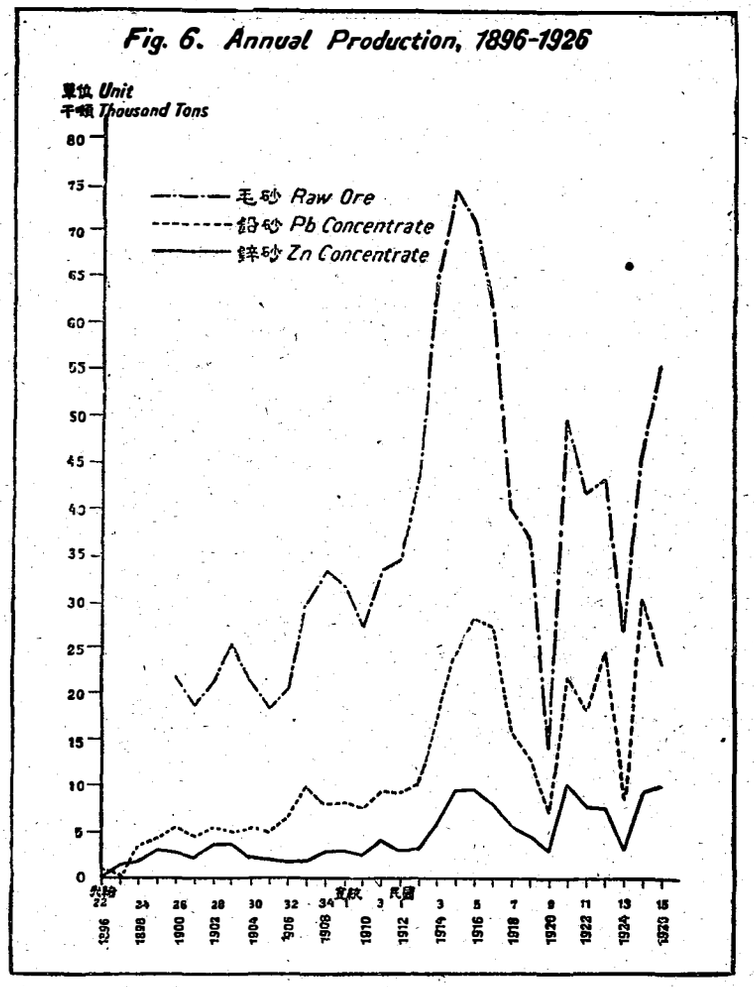
No. 3 shaft is inclined which connects the old workings on the 1st level and serves as a ventilation winze.

The ore is mined by overhand method; sometimes filling is resorted to. Timber is very little used; in rare cases, where the back is very bad, square sets are used to avoid the danger of falling. Most of the stopes are open without support, some reaching a height of over 100 feet. Drilling is done by hand. 12 compressed air rock drills and a 60 h.p. air compressor were once put in operation,

第三圖 水口山礦坑道平面圖

Fig. 3. Under Ground Plan of Shui Kou Shan Mine.





but later abandoned owing to the very poor results obtained most probably due to unskillfulness of labour. Black powder consisting of 70 per cent. sodium nitrate, 16 per cent. charcoal, and 4 per cent. sulphur is the only explosive used in the mine, which costs about $21.00 every 100 catties. The monthly consumption averaged in 1925 about 7,200 catties or nearly 5 tons. Three drill holes, 2 cm. in diameter and 1.5-ft. in depth which is about the work done by a miner in an eight-hour shift, are fired at the same time, producing 2 to 10 piculs of raw ore. In all the levels and main drifts a 24-lb. rail truck was laid or built. The ore mined in the stopes is loaded by shovelling into cars, which are pushed to the shaft collar by men where they are hoisted individually by the hoisting engine. A 15 h.p. engine in the 3rd level hoists the ore mined from the 4th and 5th levels up through the vertical part of No. 1 shaft, and a 50 h.p. engine takes it to the surface. Ore from the 1st, 2nd and 3rd levels can be hoisted directly by the 50 h.p. engine of the surface plant. Daily production of raw ore reached a maximum of 200 tons.

Ventilation is effected by natural draft, No. 2 shaft serving as the downcast and No. 1 shaft the upcast. Underground reservoirs were constructed in the 1st, 3rd and 5th levels and water is pumped to the surface by steam pumps of different sizes. 50 and 30 h.p., double and single, 5-in. piston pumps are the machines now in use. Man drifts are lighted by electricity, and in working places or stopes a kind of native oil called " Tung-yu " is used instead.

Ore Treatment

Raw ore coming from the mine is treated into two great divisions, *i.e.*, the Chinese floors and the foreign dressing plant. The ore is trammed from the shaft top and dumped in front of a big sorting shed into which it is carried in baskets to be cobbed and sorted by boys, and at the same time it is classified into lumps, coarses, fines and waste. The lumps are again cobbed and sorted closely, obtaining clean galena and zinc blende which are sent to storage bins for shipment. The remaining lumps and coarses are sent to the " foreign " dressing plant and the fines to the Chinese floors.

On the Chinese floors, the ore is concentrated by hand jigging in shallow baskets immersed in water, applying the same principle as in mechanical jigs. After a few pulsations the galena sinks to the bottom of the baskets, the waste stays on top, while the zinc blende lies between. The operator skims off the waste with a scraper and repeats the pulsation, rejecting the upper skimming of waste and throwing on to a heap for second skimming of middling. The concentrated galena is then thrown out on to another heap and when sufficient has been accumulated, it is carried to storage bins for shipment. The middling or mixed product, which consists chiefly of zinc blende, is subjected to a similar treatment until the galena has been eliminated as far as possible, leaving a zinc concentrate and a second middling. The lead and zinc concentrates thus obtained amount to 50 and 400 piculs per day respectively. The second middling together with tub sludge or sediments are crushed by hammering and beating on an earth floor and are concentrated by repeated washings down a circular concave inclined plane, cement-faced and built of brick. At the lower side of the plane is placed a rectangular wooden trough, the lower end of which is connected with a water tank. The sludge is packed into a layer at the top of the plane, and the operator flicks up jets of water in rapid succession with small bamboo scoops. The waste is carried down by the washing water to the bottom of the plane or washed off through the trough to the tanks, while the heads settle higher up which can be separately collected. If the tail is not clean it is treated in a similar way. This process may be called buddling. The amount of lead concentrate obtained in this way may reach 20 piculs a day.

The " foreign " dressing plant was built in five stories, treating 200 tons of raw ore daily. It is well equipped with mechanical appliances and ore-dressing machines. The flow sheet (Fig. 12) following outlines the treatment process at the " foreign " dressing floors :

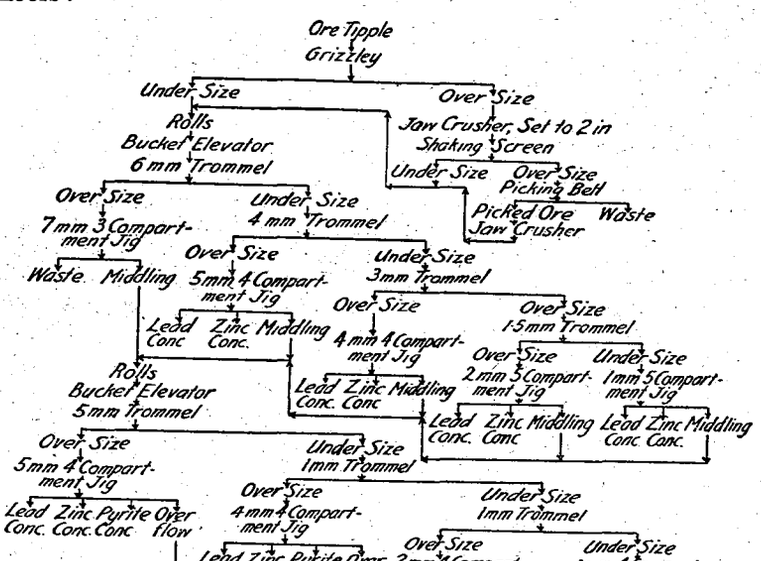


Fig. 12.

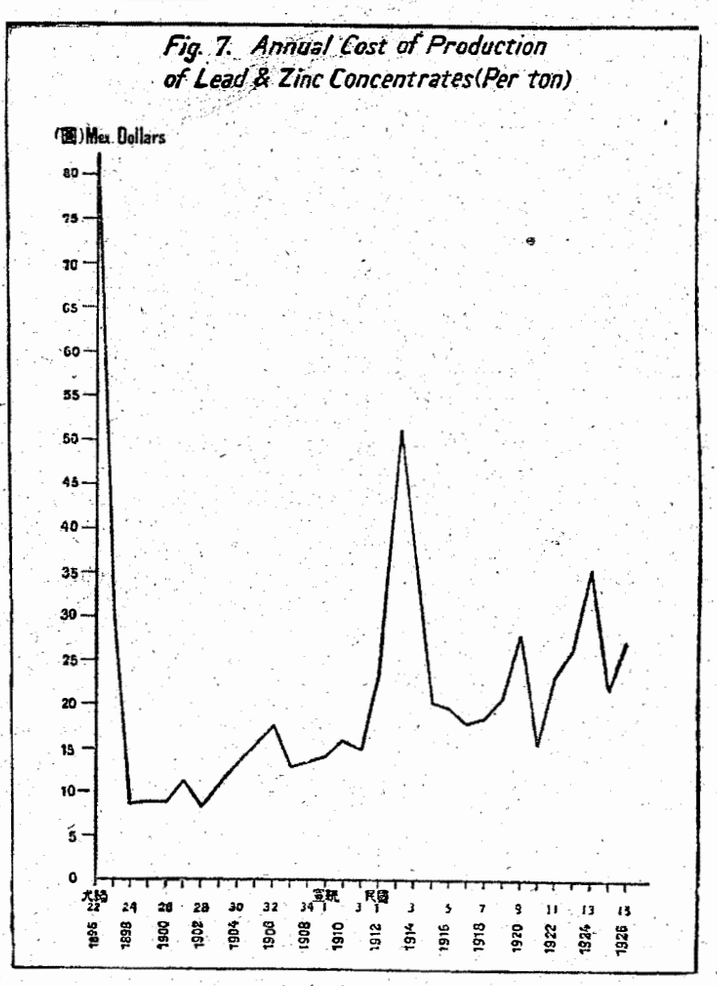
Flow Sheet of the Shui Kou Shan New Mill.

Water consumption in the mill amounts to 1,100 to 1,200 gallons per minute. The mill is provided with a 120 h.p. steam engine and three boilers, consuming 200 piculs of coal per day. As shown in the following table, it is interesting to note that almost the same degree of concentration is obtained by the Chinese hand methods as by the mechanical appliances in use.

	Lead conc.			Zinc conc.		
	Pb%	Zn%	Ag oz ton	Zn%	Pb%	Ag oz ton
Picked and sorted	58-60	5-15	24-36	36-46	6-10	4-8
Hand jigging	56-66	5-10	24-36	25-35	6-14	6-10
Buddling	40-50	8-16	24-36	——	——	——
" Foreign " floors	50-65	5-10	24-36	26-36	6-12	6-10

Mechanical Equipment

The mine is well equipped with a boiler house, a hoisting plant, an electric lighting house, an ore dressing plant, and engineering



shops of different kinds. Steam power is used throughout. The boiler plant consists of four Babcock and Wilcox boilers and two fire-tube boilers, generating about 100 h.p. each. A bituminous coal of good quality mined in the vicinity of the mine serves as the fuel, which costs from $6.50 to $7.00 per ton according to the percentage of fixed carbon in the coal. The monthly consumption averaged in 1925 about 1,600 tons. The hoisting plant is equipped with a 50 h.p. hoisting engine operated by steam. A 40-lb. rail double track runs from the shaft top to the 3rd level. The hoisting rope is 1-in. in diameter and the hoisting speed averages at 120 meters per minute. The lighting house supplies the electricity chiefly for lighting purposes. No electricity is used as the source of mechanical power. The ore-dressing plant is designed to handle 200 tons of raw ore daily and is equipped with three 100 h.p. boilers, a 120 h.p. steam engine, and a complete set of mechanical ore-dressing appliances, such as grizzley, crushers, trommels, rolls, shaking screens, jigs, elevators, pumps, settling tanks, Wilfley tables, etc. The mine is also equipped with engineering shops for moulding, pattern-making, fitting, welding, and boiler-making. Castings up to 1 ton or more in weight can be turned out. Boilers, pumps, and small steam engines are efficiently made here at a cost which is one-third lower than that of the imported materials.

Transportation

In early times the ore concentrates are carried from the mine to Sung Po only by coolies at a cost of $1.00 per ton. In 1912 a light railway was constructed between the mine and Sung Po, which is 9.5 *li* in length, costing $50,000. The truck was built to 90 cm. gauge with ties laid 1.5 to 2-ft. apart. It carries a full load of 50 tons, consisting of a train of 12 to 16 cars of concentrates plus a 30 h.p. locomotive, which runs 4 to 5 trips a day, consuming 2 tons of coal. On the return trips coal and general supplies are brought back. There are no loading facilities at Sung Po. When the concentrates reach Sung Po station, they are tipped from the trucks, shovelled into baskets, and carried down the river bank by coolies to Chinese junks which are dragged by small steam boats to Changsha where usually the Hunan Provincial Lead Smelting Works takes delivery. During low waters no steam boats can pass and small launches are the only vessels available. The transportation cost from the mine to Sung Po worked out at about $0.50 per ton and from Sung Po to Changsha at about $3.00 to $3.50 per ton, making a total of from $3.50 to $4.00.

Management

The mine is owned by the Hunan Provincial Government, by which the mine director or superintendent is to be appointed. The general office of the mine consists of six departments, *i.e.*, (1) mining, (2) ore-dressing, (3) mechanical engineering, (4) transportation, (5) mine accounting, and (6) general affairs. There is a head officer in each department, a chief chemist, and a chief engineer—the latter in charge of departments 1, 2, and 3 and the chemical laboratory.

The number of laborers in the mine was about 3,000 before September, 1926, after which it was suddenly and greatly increased for a period of several months to more than 6,000 owing to the activity of the then Labor Union at the mine. The Union has recently been dissolved by the Government in order to re-organize the mine and more than one-half of the men were laid off, reducing again to about 3,000. Stoping, drifting, and ore-dressing on the Chinese floors are all done by contract work, while in the "foreign" plant and other works, the day's pay system is adapted. The table below shows the number of laborers in the different works and their monthly wages paid during the year of 1925.

	No. of laborers	Monthly wages
Underground mining	1,000	$6.00–15.00
Ore-dressing	1,000	9.00 —
Power house, shops, etc.	337	6.60–50.00
Transportation	94	7.20–10.80
Chemical laboratory	5	8.40–15.00
Office servants and guards.. ..	100	8.40–13.50
All others	300	6.00– 8.00

There are three 8-hour shifts in a day; the morning shift from 6 a.m. to 2 p.m., noon shift from 2 p.m. to 10 p.m., and night shift from 10 p.m. to 6 a.m.

Production and Operating Expense

The following table and the graphic representations (Figs. 6 and 7) show the annual production from 1896 to 1926 of the concentrates, the annual operating expenses, and the cost per ton of lead and zinc concentrates produce, the latter averaging $21.50 per ton. For reference, the distribution of the operting expense during the year of 1925 is also shown in a separate table below.

Telephones in Chekiang

LONG-DISTANCE telephones have been installed in Chekiang province for several years and have been doing a thriving business. Up to the end of last year the line in Eastern Chekiang had been extended to Ningpo; that in the Kashing district to Fengking and Sungkiang in Kiangsu province; that in Huchow district to Wukang, and that in Hangchow district to Fuyang. Since the Kuomintang authorities took over the control of Chekiang this year the services have been extended in all directions. To-day the eastern line, starting from Siaoshan and Shaohing, has reached Chinhai, *via* Ningpo; the western line has been extended from Huchow to Szean; and the southern line from Fuyang to Tunglu with the intention to extend to Yenchow. Last year a plan for establishing telephone connections between Chekiang, Kiangsu, Fukien, Anhwei and Kiangsi was formulated, but has now been shelved.

In the province there are up to date 49 long-distance telephone sub-offices and agencies, in which more than 300 operators and others are employed. This summer the Chekiang Long-distance Telephone Workers' General Union was organized with the approval of the local Kuomintang. As the telephone service is gaining popularity the business of the telegraph office has been seriously affected. The Chekiang Telegraph Administration recently requested the provincial government to order certain long-distance telephone offices to suspend transmission of commercial messages, but the request was rejected.

Through Traffic Conferences.—The through traffic conference between the Peking-Mukden Railway and the Mukden-Hailung Railway was opened in the Ministry of Communications on November 25. The conference between the Szepingkia-Taonan Railway and the Tahushan-Tungliao branch line of the Peking-Mukden Railway was opened on November 29.

Hokkaido Dento K.K.—The No. 2 Antaroma Power Station of the Hokkaido Dento K.K., located near the Antaroma No. 1, station, capacity 5,882 k.w., was recently completed. The new station has the same capacity as the No. 1.

Shibaura Engineering Works supplied most of the equipment for these two stations.

Commercial Radiograms in China.—Commercial radiograms on and after December 1, 1927, will be accepted by all the radio stations under the control of the Nationalist Government Radio Service of the Military Council. For the first month only half of the regular rates will be charged to encourage the use of radio, and thereafter all radiograms will be charged for at the same rates as fourth class telegrams transmitted by the Chinese Telegraph Administration.

Radio stations have been installed in 16 cities in the Nationalist territory; namely, Canton, Yunnanfu, Foochow, Amoy, Hangchow, Shanghai, Woosung, Nanking, Tsungming Island, Kiukiang, Hankow, Wuchang, Chengchow, Loyang, Taiyuan and Ninghsia. In Shanghai the station is located at Pung Lai Road, West Gate, Native City. The first station was installed in June, 1927, in Nanking by General Chiang Kai-shek, and the other stations have been installed subsequently. The director of the entire service is Lu Lee, and the traffic manager of the Shanghai Station is Z. S. Yu who is concurrently the business manager of the Nationalist Government Radio Works at 862 Avenue Haig. The works are engaged in manufacturing radio sets with imported parts and in installing radio sets in various parts of China.

The works also maintain a training school which was started in June, 1927. The first class was inaugurated in the same month and was graduated in July. The second class started in July, however, was not graduated till the end of November. The school gives three distinct courses. One is devoted to engineering and is open to graduates of colleges. The second is devoted to mechanics and the third to operation of radio sets. Both courses are open only to middle school graduates. The graduates are capable of sending and receiving 80 letters per minute as evidenced by tests made.

All the stations except that at Woosung have short wave lengths. The cost of installing a long wave length station is approximately $30,000 while that of installing a short wave length station is between $5,000 and $8,000. Each station has from 3 to 8 operators, the average monthly overhead per station being $1,000. The government has appropriated some $10,000 per month, and the deficit is expected to be made up by revenue from commercial radiograms, now that the stations are not crowded with military messages. Other stations will be installed from time to time.

Tokyo Dento Sale of Enoshima Tramway nears Decision.—Tokyo Dento originally asked Y.1.700,000 for the 6½ miles of electric tramway between Fujisawa and Enoshima, and was offered Y.1,500,000 by Tsunkkichi Ogura. The sale is expected to be made in the near future at Y.1,600,000.

Electrical Development in Central Japan.—The Shin Aichi Shimbun reports that at the end of October there were 193 electric light and power companies operating and 8 companies organized but not yet open to business in the seven prefectures of central Japan including Aichi, Gifu, Miye Nagano, Toyama, Ishikawa and Fukui. This does not include 735 companies, mostly very small, which generate electric power for their own use only, and 57 companies which have plans for supplying their own needs.

According to this report, 776,000 kw. is generated by companies in these prefectures, while 403,000 kw. of uncompleted construction will bring the total to 1,180,000 kw.

Power stations in this territory which have been or will be completed during the present year include:

Nippon Denryoku	Yanagawara	45,000 kw.
Toshin Denki	Kokuro	15,800
Shinano Denki	Takazawa No. 2	9,100
Hakusan Suiryoku	Yoshinotani No. 2	800
Yahagi Suiryoku	Shima	1,600
Okazaki Dento	Ohama Steam	5,000

Power Stations completed and to complete in 1928:

Showa Denryoku	Shokawa No. 2	45,000
Hakusan Suiryoku	Torikoshi (?)	13,000
Tenryugawa Denryoku	Minamimuki	25,000
Azusagawa Denryoku	Kazumizawa	32,000
Nose Denryoku	Kinbara	5,000
Mikawa Suiryoku	Koshido	9,000
Gifu Denryoku	Kanayama	6,000

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THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

BEST TRADITIONS OF THE SERVICE

PRESIDENT COOLIDGE IN PRAISE OF CONSUL DAVIS

THE LOAN POLICY OF THE STATE DEPARTMENT

SETTLEMENT OF THE NAN-KING OUTRAGE

THE NEW TONE IN CHINA

Vol. XXIV March, 1928 No. 3

SHANGHAI, PEKING, TOKYO AND MANILA

American Capital for Manchurian Railways

By Mr. K. K. Kawakami

THE reported loan negotiations between the South Manchuria Railway and J. P. Morgan and Company has attracted considerable public attention. Whether the negotiations succeed or fail, facts relative to the status of that Japanese railway should be carefully considered.

Originally built and owned by Russia, this Manchurian line was transferred to Japan by the Portsmouth Peace Treaty of 1905, which ended the Russo-Japanese war. To confirm this transfer Japan in December of the same year made a separate treaty with China. In the protocol to that treaty China agreed, as she had done with other countries in similar cases, not to build parallel lines to the South Manchuria Railway (The common assertion that this agreement was a result of the twenty-one demands is entirely wrong).

Had Japan known that China had been in secret alliance with Russia and had clandestinely helped Russia throughout the war, she might have been far more exacting in dealing with the Chinese Government. That secret Russo-Chinese treaty of alliance had been most carefully guarded, and was never officially published until China was forced to bring it out at the Washington Conference of 1921. While Japan was fighting against Russia to preserve China's integrity, China, by virtue of that secret treaty, facilitated and expedited Russia's military operations in various subtle ways. Japan, however, went no further than obtaining from Russia, not from China, some of the rights which the Peking Government had given the Czar.

As soon as the Portsmouth treaty was signed the late Mr. E. H. Harriman tried to secure a half interest in the Manchurian railway. But Japan could not see her way clear to accept the overture, as the railway was the only valuable property given her as the result of the war which cost her a hundred thousand lives and a billion dollars. Nor did President Roosevelt extend active support to the Harriman project. His policy towards Japan was summed up in these sentences in his letter to Mr. Taft :—

" Our vital interest is to keep the Japanese out of our country and at the same time to preserve the good will of Japan. The vital interest of the Japanese, on the other hand, is in Manchuria and Korea. It is therefore peculiarly our interest not to take any steps as regard Manchuria which will give the Japanese cause to feel, with or without reason, that we are hostile to them, or a menace, in however slight a degree, to their interests."

Naturally Mr. Roosevelt deeply deplored the policy initiated by Secretary Knox under the presidency of Mr. Taft. He characterized that policy as " ill-advised " and " combining irritation and inefficiency." At any rate the Japanese saw in Mr. Knox's proposal for the " neutralization" of the Manchurian railways the revival of the Harriman scheme in camouflage.

The next American project to gain a foothold, or as the Japanese saw it, to undermine the Japanese position, in Manchuria was conceived by Willard D. Straight, then American Consul-General at Mukden, Manchuria. It was plainly the resuscitation of the Harriman project. Briefly it proposed to build a trunk railway through Manchuria between Chinchou and Aigun, a distance of some 1,000 miles. It was evidently a scheme to put the Japanese in Manchuria out of business by lining up American, British, French and even Russian capital against them. Why Straight in his earlier days cherished a grudge against Japan is a mystery. In outlining his scheme in a letter to Morgan and Company Straight said :

" English and American capital, together with French capital, should be used to bolster waning Russian prestige in the Orient, besides ensuring for themselves the political support of the Russian Government in their enterprise in Manchuria and Mongolia. Leaving Siberia out of discussion, the most promising field for the Group's Eastern activities would be Manchuria and Mongolia. It should in these regions be possible to act as China's partners, not as lenders alone, for the political situation, particularly in Manchuria, forces China to grant terms more favorable than could be secured elsewhere, while in neither region is popular sentiment, a growing obstacle to foreign investment in South China, an important factor."

It was the irony of fate that Russia, for which Straight had a kindly feeling, objected to the Chinchou-Aigun railway project more vigorously than Japan did. Japan, in fact, acquiesced in it on condition that the South Manchuria Railway be permitted to build a line to effect a junction with the proposed American line. But due to Russian opposition and various obstacles from Chinese sources, Willard's grandiose scheme was abandoned. In his later years Straight was a wiser, if disillusioned, man. As Mr. George Marvin, vice-consul at Mukden under Straight, tells us, " Chinese incompetency, dilatoriness, utilitarianism and downright dishonesty slowly alientated the warm sympathy of his (Straight's) earlier dreams. Correspondingly he came, in his own exasperation, to realize more clearly some of the conditions with which successive but unsuccessful Japanese ministries had been contending."

" As Straight," says Professor Paul H. Clyde, of Ohio University, " looked back on those active years when he was carried forward in the whirl of Far Eastern politics by his own brilliancy and youth, he changed his views and sympathies on things Chinese and things Japanese." In his closing years, indeed, he found it practicable to co-operate with the Japanese rather than with the Chinese or the Russians. When in 1917 Straight secured a contract with the Chinese Government to improve the Shantung canal, he admitted Japanese interests into the enterprise.

The Morgan loan, if concluded, will be the first profitable American investment in Chinese railways. Besides the Harriman and Straight projects, a few attempts have been made by American financiers and entrepreneurs to enter the Chinese railway field, but chiefly owing to the distracted conditions in China none has been successful.

S.M.R. Bridge Across the Honho River

The South Manchuria Railway Company was organized in 1906 in accordance with the commercial law of Japan with an authorized capital of $100,000,000, shares of which were equally divided between the Japanese government and the investing public. The Chinese Government was invited to subscribe to the shares allotted to the Japanese Government, but the invitation was declined on the ground that there was no available land for the purpose. The company operates 437 miles of the main line from Changchun to Dairen with branch lines totaling 261 miles. In addition it undertakes mining, iron works, marine transportation, improvement of lands, public works, sanitation, and education in the railway zone.

It is interesting to recall that Mr. Thomas Lamont, who is now considering a substantial loan to the South Manchuria Railway, played in 1918 the leading part in organizing an International Financial Consortium for the financing of China. The consortium has been almost forgotten, and among the Chinese it has been especially unpopular. Nevertheless it is still in existence, and it may well be asked whether its principle does not conflict with the proposed Morgan loan to the South Manchuria Railway. The answer is plain in the agreement of the consortium made in May, 1919. Article 1 of that compact provides that agreements and options relating to industrial undertakings in China, including railways, upon which substantial progress has been made, need not be pooled in the consortium. The British Government, explaining the scope of the consortium to the Japanese Government, stated that it was "prepared to subscribe to a written assurance to the effect that the Japanese Government need have no reason to apprehend that the consortium would direct any activities affecting the security of the economic life and national defense of Japan." It also assured the Japanese Government that Japan could "firmly rely upon the good faith of the Powers concerned to refuse to countenance any operations inimical to such interests" of Japan.

Practically the same assurance was also given by the American Government. Consequently the final consortium agreement reached in May, 1920, excluded the following railways in Manchuria, then built, building or projected from the scope of the consortium:

(1) The South Manchuria Railway and its branches, 690 miles, owned by Japanese.

(2) Projected Kirin-Huinin line, about 270 miles, to be built and owned by the Chinese Government, financed by Japanese.

(3) Projected Kirin-Kaiyuan line, about 230 miles. Ditto.

(4) Projected Changchun-Taonanfu line, about 180 miles. Ditto.

(5) Supingkai-Taonanfu line, about 190 miles. Financed by Japanese, owned and operated by the Chinese Government.

(6) Shinmintun-Mukden line, 36 miles. Ditto.

(7) Kirin-Changchun line, 79 miles. Ditto.

Besides the above railways, built and projected, there are in Manchuria 280 miles of railways owned by the Chinese Government but financed by British capital, as well as 1,070 miles of Russian-owned railways.

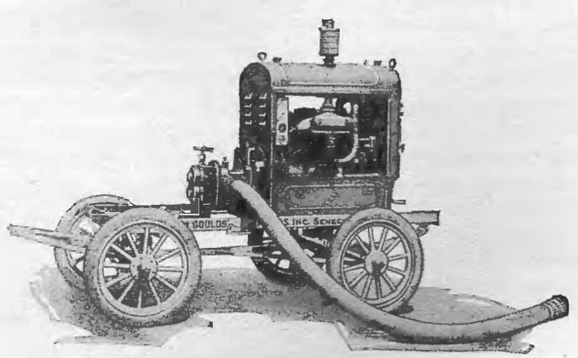
The Morgan loan, if concluded, will be used not for the extension of the existing lines of the South Manchuria System, but for the retirement of some of the 7 per cent. loans now outstanding and for the improvement of the roads and the purchase of American refrigerator cars to be employed to bring meats from Mongolia to the Japanese market.

In its physical aspect the South Manchuria Railway is an American railway, as its rolling stock and other materials are mostly of American origin. Since 1907 the Railway has purchased American materials to the value of more than one hundred million dollars. In addition American machinery and materials worth about $70,000,000 have been imported by other Japanese business houses in Manchuria. Throughout the instrumentality of the railway Manchuria has achieved a phenomenal economic progress. As a result the port of Dairen, built by the Japanese, has become the second largest commercial port of China, preceded only by Shanghai. Through this port the products of Manchuria are exported to all parts of the world, but principally to Japan, whose growing population relies more and more upon food supplies and minerals obtained from Manchuria. But the greatest beneficiaries of this development are, of course, the Chinese themselves. Before the advent of Japanese enterprise the Manchurians, almost entirely farmers, barely eked out an existence by taking in each other's washing, for their products had no market outside of their own sparsely populated territory. Now the same products go to all parts of the world, for the Japanese have opened up vast markets for them. Nor is this all. Hundreds of thousands of Chinese laborers migrate every year from China proper beyond the Great Walls into Manchuria, the new land of promise made possible by Japanese enterprise. They come to Manchuria because the country has been made prosperous through well-managed Japanese railways and well-developed trade facilities, and also because peace and order prevails there under Japan's stabilizing influence, while all other parts of China have been made utterly unlivable by continuous civil wars and factional feuds. One should not be regarded as anti-Chinese because he tells the truth about China. Indeed, he alone is China's friend who is not afraid to speak plainly where China is in the wrong. China can never win the respect of the world if she refuses to listen to the plain talk of her friends.

A New Portable General Service Pump

GOULDS PUMPS, Inc., of Seneca Falls, N. Y., have recently brought out a rotary pumping outfit consisting of a gear type rotary pump close coupled by means of a pin and buffer flexible coupling to a gasoline power unit. The pump and engine are mounted on a four wheel trailer having rubber tires and springs, front and rear. The pump is equipped with relief valve and discharge gate valve which may be threaded to suit various hose coupling threads. The suction is fitted for 4-in suction hose which can be furnished by the purchaser or the manufacturer.

The pump has an iron case and bronze cams. Ball bearings are used throughout. The cams are piloted at either end of the pump with steel pilot gears cut from the solid. The pump is bolted and doweled to the power unit frame by means of an open adapter casting which allows perfect access to the flexible coupling.



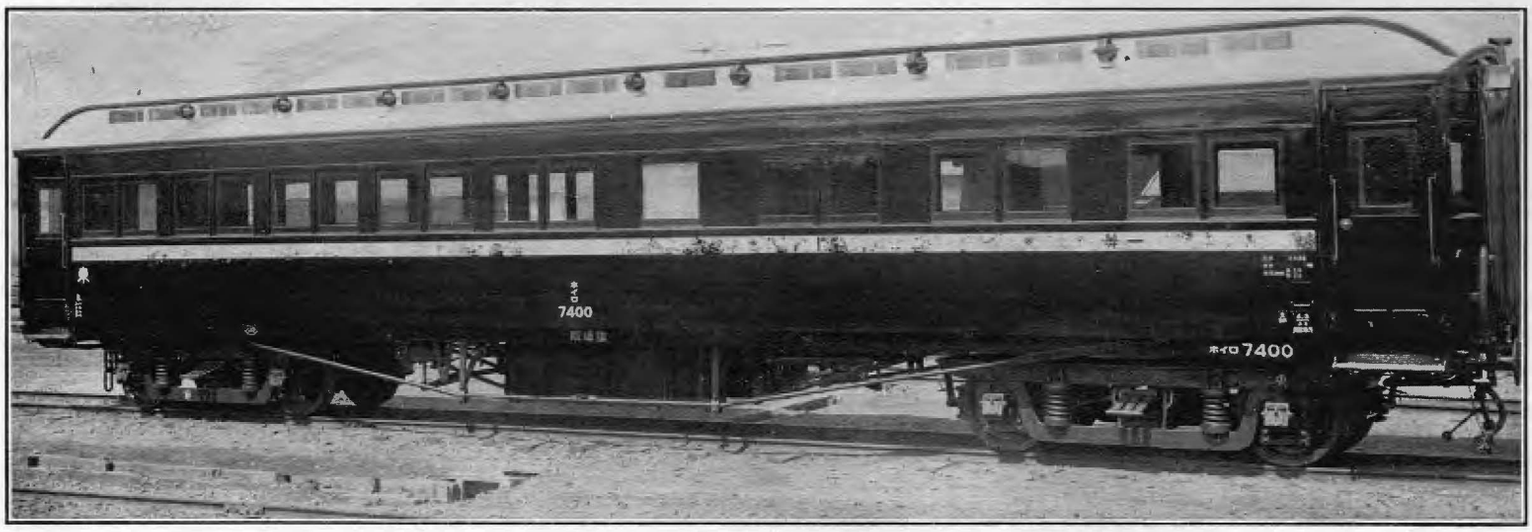
New Goulds Pumps

The engine is a standard self contained, enclosed, industrial power unit with all accessories, ready to run as soon as fuel, oil and water are added.

The trailer chassis is a steel frame fitted with springs both front and rear. The wheels are fitted with roller bearings of the completely enclosed type and the tires are of hard rubber.

The outfit will throw a standard 250 GPM fire stream through a $1\frac{1}{8}$-in. standard hose nozzle with a pressure of 100 lbs. per sq. inch at the pump using 100-ft. of $2\frac{1}{2}$-in. hose.

This new unit has been designed for the use of small villages or communities and for industrial plants having no regular fire protection. In addition to fire service the unit is suitable for pumping our cellars or for any general emergency pumping service.



Passenger Car, Japanese Government Railway

The Statistical Aspect of Railway Operation Methods

H. Stringer, B.A., A.M.I.C.E., late Government Railways of China

THE present position of British railways is unsatisfactory. For some years large inroads have been made on reserves to pay dividends, motor transport competition is becoming increasingly serious and the ratio of expenditure to gross receipts has risen from 83 per cent. in 1924 to 90.7 per cent. in 1926.

That comparisons are odious is unquestionable but that they are instructive is sometimes overlooked. In any case the contrast of vital railway operation statistics on which labour conditions have little or no bearing gives much food for thought when British railways are considered *vsi à vis* other countries.

Take the case of that most vital of all railway operation figures : average tons per train. The following table is illuminating :—

	Average tons per train.	Date	
Great Britain	135.35	July 1920	Cape Government Railways.
	123.52	March 1921	
	129.75	June 1925	142 tons 1916
	124.00	June 1926	
United States	386.00	1911	
	409.00	1912	
	445.00	1913	
	708.00	1920	
	713.00	1923	
	772.00	1926	
India	189.00		
Japan... ...	128.00	1916	
	142.00	1918	
Germany ...	240.00		
Chinese Government Railways	257.00	1918	

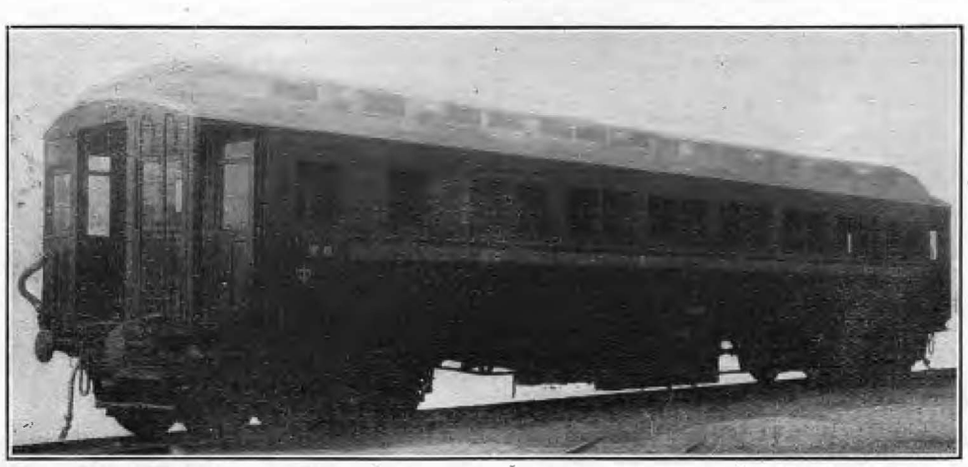
The striking fact here is that the British railways in this respect are to be classed below Japan, a narrow gauge country.

Tons per train is controlled largely by gauge, limiting gradients' rail weight, rolling stock equipment, empty wagon mileage and full loads when trains are run.

With regard to gauge, the railways of United States, Great Britain, China and Germany are standard 4-ft. 8½-in. with negligible exceptions. India has three gauges* 5-ft. 6-in., metre and 2-ft. 6-in., the various approximate mileages under each gauge being 18,000, 14,800 and 4,485, while Japan and South Africa have a 3-ft. 6-in. gauge with a considerable mileage of 2-ft. 6-in. and 2-ft. 0-in. gauge, the mileage of 3-in. 6-in. in Japan being 6,125 and that of the narrower 2-ft. 6-in. gauge 1,465, while the mileage of 3-ft. 6-in. gauge in South African Railways was 1916 8,899 and 2-ft. 0-in. gauge 520 miles.

The effect of gauge on train load for gauges of metre and upwards is slight for given the railweight locomotives can be designed to handle up to the full capacity of the rail, but for gauges below this conditions of stability and the necessity of limiting piston speed have a decisive effect on design which increased railweight cannot counteract. The most vital effect of narrow gauge is its effect on line capacity owing to lower speeds.

From the previous paragraph it will be observed that the British railways suffer no real handicap from the gauge question, and the same conditions obtained with regard to limiting gradient, the ex-European Railways in the list operating considerably heavier grades on their first-class lines. Thus in China limiting grades for easy country are 1 in 150 while in mountain districts 1 in 30 is allowed, two such mountain railways being included in the report for China from which the figure of 257 tons per train is obtained. Again Japan is hampered by a limiting gradient of 1 in 40 on important lines and also has to operate at least two rack sections, while the Indian railways are



Japanese Built Car

*1915 figures.

handicapped by limiting gradient of 1 in 80 for the 5-ft. 6-in. gauge, 1 in 50 for the metre and 1 in 30 for the 2-ft. 6-in. Practically similar conditions are met with in South Africa where grades exceeding 1 in 40 are operated and 1 in 40 is the ruling grade throughout the country.

In the matter of rail weight the most vital factor after gradients in its effect on train load the British railways occupy an exceptional position, the 90 to 100-lb. rail being general and the 80-lb. rail rather exceptional for first-class lines. The railways contrasted have the following rail weights :—

United States	80 to 100 lbs.	85-lb. being general.
India	69 „ 100 „	on the 5-ft. 6-in. gauge.
	50 „ 41¼ „	on the metre gauge.
	30 „	on the 2-ft. 6-in. gauge.
Japan	60 „ 70 „	on the 3-ft. 6-in. gauge.
Germany...	about 85 „	18-ton axle loads.
China	85 „	
South Africa	80 to 60 „	the mileage under 80-lb. rail being comparatively small while a 35-lb. rail is standard on the 2-ft. 0-in. gauge lines.

The effect of rail weight on train load is, of course, to cut down the allowable axle loads on locomotive drivers, thus limiting adhesion and haulage capacity. While it is recognized that there are other vital factors affecting average train load such as empty wagon mileage, gradients, etc., the following table for the three Indian gauges is unquestionably illustrative of this effect :

Railway	Rail weight	Train load
5-ft. 6-in. gauge.		
Bengal Nagpur	90	298
B.B. and C.I.	69	310
East Indian	85	317
G.I.P.	100	215.5
Metre Gauge.		
Assam Bengal	50	109
Bengal N. Western	50	113
B.B. and C.I.	41.25	137.3
Burma...	50	138.9
2-ft. 6-in. Gauge.		
Nagpur Chindwara	30	78.3
Kalka Simla	30	22.3
Trans Indus	30	25.2

The above figures are for the first half of the year 1917-8.

This table also sufficiently indicates the effect of gauge and rail weight on reducing the average train load for a country such as India with a considerable mileage of mixed gauges. Yet India as a whole shows a better average by over 60 tons than the British railways equipped to more or less uniform and infinitely superior standards. In the case of United States, Germany and China countries where equipment is more or less to British standards it will be observed that average tons per train is enormously in excess of that obtained in Great Britain. In the case of China* this average is reduced by inclusion of a metre gauge line operating traffic over a line equipped with a 56-lb. rail and having a limiting grade of 1 in 48. Yet the average of this line in 1918 was 105 tons per train.

The mileage of 2-ft. 6-in. gauge in Japan and 2-ft. 0-in. gauge in South Africa would also, of course, have a lowering effect on average train load.

The effects of train load of rolling stock equipment, empty wagon mileage, are so closely related that they will be dealt with as a whole.

Thus in the first place it is obvious that necessary equipment is limited by line capacity in the first place, that is number of tracks and if single tracks frequency of crossing places. Line capacity again is further limited by average speeds.

In this respect the British railways occupy a vastly superior position as practically all important lines have four tracks in congested districts with separate tracks for fast and slow goods, while single track mileage is almost negligible instead of being usual in the case of all the ex-European Railways considered. The British railways should therefore be in a position to cope with a vast traffic with rolling stock of a total car capacity, for tonnage offering, giving far less margin than the other railways considered for line capacity aside, England must be a country of conspicuously short hauls and average speeds should be considerably higher than lines in the majority of cases single tracked.

Further in the question of empty wagon mileage the British railways should be in a superior position to the railways considered, for they are neither faced with the peak load conditions of a grain country nor with the problem of dealing with traffic which at certain seasons of the year sets in a fixed direct direction entailing long return hauls of empty stock as there is no return tonnage. This results in enormous reduction in average train load for these return train miles are totally unproductive, whereas the direct opposite must hold in Great Britain with its vast import and export trade. There should in England be always a high proportion of return tonnage and average train-load should show this, which it certainly does not. The Percentage freight upon capacity hauled in Great Britain should be considerably superior to any of the railways under consideration. The table given below indicates just a fair efficiency.

Shortage of rolling stock might be alleged as an excuse for poor train load as in this case cars when unloaded must be hauled away at once wherever the demand is most immediate instead of waiting for a load in the immediate neighborhood. This, of course, is conducive of excessive empty wagon mileage with consequent reduction in train load. With plenty of return tonnage, as must be the case, no such excuse can be advanced.

Further, with conditions as above, number of loads per car per year or annual tons per ton of car capacity should be exceptionally high on the British railways if cars are unloaded with promptitude and demmurrage rates made sufficiently exorbitant. On the Chinese railways which are lamentably short of rolling stock and where the average haul for the system is 185 kilometers—115 miles—(the least being 67 kilometers and the maximum 310 kilometers) the number of loads per annum per car reaches the high figure of 75, the maximum being 204 for a short mineral line—45 miles average haul—and the minimum 31 for a line run at a loss. The time allowed for unloading on the Chinese railway is 12 hours.

In connection with freight stock operation and rolling stock equipment it is of considerable interest to contrast the equipment for dealing with traffic of varying density.

Country.		Goods Traffic Tons per mile	Trains† Per Day	Engines Per Mile	Wagons Per Mile	Average Haul miles.
Great Britain ...	1912	22,300	50.4	1	33.5	—
	1921	(March) —	—	—	—	55.87
	1925	16,600	—	1.2	35.3	51.7
United States ...	1911	7,420	14.2	0.25	8.8	149
	1920	—	14.2	—	10.0	—
	1924	—	13.6	0.27	10.0	—
	1926	5,760 (57% mineral)				332
Bengal Nagpur ...	1918	3,675	24.9	0.27	8.06	305
Bombay Baroda...	1918	2,400	23	0.29	7.1	356
East Indian ...	1918	9,300	41.7	0.51	12.4	385
		The above 3 Indian lines are 5-ft. 6-in. gauge.				
South Africa ...	1916	1,460	10	0.17	3.13	184
China	1918	5,320	12	0.037	2	115
Japan	1918	9,370	27.2	0.543	8.8	103

Country		Total Wagon Capacity Tons	Average Freight Train Speed	Number of loads per car per yr.	% Freight on capacity hauled	Average Capacity per vehicle tons.
Great Britain ...	1925	7,457,902	3.7	45	54%	10.2
United States ...	1920	98,342,666	10.3	19.2	—	42.5
	1921	—	—	—	63	—
	1923	—	10.9	—	—	—
	1924	104,148,002	—	20.0	65.1	44.5
	1926	—	11.9	—	—	—
Bengal Nagpur ...	1918	233,000	—	30	50	16.5
Bombay Baroda...	1918	176,000	—	19.8	44	18.7
East Indian ...	1918	592,000	—	25.2	44.7	17.0
South Africa ...	1916	547,185	—	24.6	—	20.6
China	1918	246,849	—	75	(est.) 36.5	23.0
Japan	1918	467,021	—	107.5	51	10.0

*China's total mileage being only 3,465.

†This figure obtained by dividing daily train miles into mileage is for all classes of trains. Goods trains per day on the three Indian lines are 10.3, 8 and 17 while in China and Japan the figures are 6.9 and 14.

Number of loads per car per year is of course obtained by dividing wagon capacity by total tons carried per year, and from the above figures it is seen that annual number of loads on the British railways is 45, a very poor figure considering the enormous tonnage available and the short haul and very high line capacity of the British railways. This figure means that the average time for each car to load, unload and travel is 8.1 days, a figure indubitably capable of reduction, for as volume of traffic increases so should number of loads per car per year and the tonnage per mile offering on Great Britain railways is enormously the greatest in the World. The number of loads per car per year should be at least twice what is surmised when the exceptionally favorable conditions are considered.

While it is recognized that it is impossible to dogmatise without an exact knowledge of local conditions, the above goods stock statistics indicate that the Japanese railways are very efficiently run but that a higher capacity wagon as on the South African railway might be introduced with considerable economy. This is a reform which must be introduced sooner or later on the British railways. The following table indicates the percentage dead weight to capacity for various classes of British built goods coal wagon. Comment is superfluous. The average wagon capacity is 10.2 tons.

Capacity of Wagon Tons	Tare of Wagon Tons	Per cent Dead Weight to Capacity	
8	5.5	68%	
10	5.8	58%	
20	8.2	41%	
25	10.17	40%	
32	13.10	41%	Hopper wagon
40	16.7	41.6%	all steel.

Further, the low percentage freight on capacity hauled for China's railways is an indication of higher empty wagon mileage as the result of inadequate rolling stock while the small number of loads per year on the Indian railways appear to indicate over equipment in spite of the very long hauls.

The question of what is adequate or inadequate in the matter of rolling stock is a particularly thorny one, but it would appear that it should be considered from the following point of view. Thus, take the case of a line equipped with a 60-pound rail, single track with crossing stations at 5-mile intervals and with a limiting grade of 1 in 120. Goods trains on such a line would not exceed a car capacity of 400 tons, and if we assume that freight is 50 per cent. of capacity hauled, tons of freight per train should be 200. Then if the average length of haul is 100 miles, each 100 miles of line should be equipped with a car capacity of 400 multiplied by the number of necessary trains obtained by dividing the daily tonnage available by 200 tons. This number of trains is of course limited by line capacity, which is, say 32 goods trains out of a daily total of 36,—four being passenger trains—for a single line as above. Thus the maximum daily capacity of a single line as above is about 6,000 tons per 100 miles, and for this 12,000 tons of car capacity is required or four 30-ton cars per mile. Passenger stock can be treated on the same basis with an assumed relation between seat mileage hauled and seats occupied generally about 25 per cent. For hauls over 100 miles * these figures for car capacity must be proportionately increased as this is assumed to be the limit of daily motion for rolling stock, a figure which excessive demurrage rates (to ensure speedy loading of empty stock) might do much to increase. Further this neglects stock not in motion.

All that can be surmised from the very favorable conditions under which British railways are placed in the matter of gauge, rail weight, line capacity, short haul, etc., is that trains are either not loaded to capacity, or that empty rolling stock is unnecessarily moved, or again that there is excessive delay in loading or unloading stock. If the need for rapid transit of goods is conducive of running trains which are neither loaded to full capacity of stock hauled nor to the hauloge capacity of the locomotive then those interested in railway transport should be called upon to bear one more hardship, that of running business on larger stock or paying higher rates. When it is recollected that mineral traffic, in a country where such output is over 200 million tons annually, must form a very high proportion of the tonnage hauled it is obvious that private wagon ownership, which is somewhere in the neighborhood of 50 per cent. of all goods stock, is at the root of much of the trouble and this must be eliminated.

The question of rapid loading and discharge for mineral traffic can be dealt with by the introduction of the high capacity hopper wagon with high level facilities for bin discharge, while for handling small consignments the introduction of fast electric travelling cranes of the gantry† type spanning several sidings should surely be feasible. Further it would appear to be advisable to throw the onus of collection and delivery perhaps even discharge and loading of cars on transport companies or even consigners or consignee.

Other obvious reforms applicable to all new work and renewals are as follows :—

The substitution of the flat footed for the bull head rail. With the 90-lb. 30-ft. rail with 12 sleepers under, this would effect an economy in chairs of 90 tons of cast iron per mile valued at at least £1,300 $13,000 at the present price of pig iron.

The introduction of the high capacity wagon for reasons previously detailed and for the economy effected in shunting and marshalling, etc.

The introduction of the Janney or other automatic coupler which would eliminate much of the risk incurred by shunters‡ and facilitate more rapid movement of cars. Further this reform would render feasible the introduction of the continuous brake for all stock, another change making for increased speed and safety of operation.

As regards personnel the following table provides a contrast :—

Country	Year	Employees per mile		Employees per 100,000 train miles	Trains per day
Great Britain§ ...	1912 Total 26	P.W. Dept.	2.83	147	48.5
	1924	34.4 ,,			
	1925	35.2			
Canada	1915 ,,	3.37		119	
United States... ...	1916	6.25 ,,	1	128.	14.2
	1925	7.5			
	1926	7.7			
France...	1912	13.9		139	
India	1915	17		382	
Japan	1918	20.8 ,,	3	213	27.2
China	1918	18.5 ,,	6.1	435	12

These figures seem to indicate that there is room for economy if we contrast the figures for the United States and Great Britain making allowance for the greater traffic density. The superiority of the United States is without doubt due to the use of machinery to a greater extent than is customary with us, a remark perhaps still applicable to most of our industries. This consideration apart it would appear that considerable reduction could be made in the Permanent Way Department.

With regard to Locomotive performance the following statistics indicate no bad performance for the British lines

Great Britain	1914	25,300 miles per locomotive per run.	
United States	1914	27,300	do.
Japan	1915	26,600	do.
China	1918	29,700	do.

Other minor reforms which would effect considerable economy are the institution of the Pullman car system giving much greater seating capacity per passenger car. Another necessary innovation capable of expansion should be modern coaling plants on the hopper system for fuelling engines.

For those opponents of the principle of nationalization of railways the following facts are presented in refutation of the fact that absence of competition is conducive of inefficiency and stagnation.

The Japanese railways were nationalized in 1906 when the total mileage was 4,371 miles. The mileage was in 1916 just under 6,000 miles while enormous betterments have been carried out in the interval. Passenger traffic has more than doubled itself and the cost of transport has fallen, while goods traffic is more than

*This figure a probably correct assumption for double track lines but should be much less for single track lines. Thus the daily movement per wagon on the Japanese railways in 1918 was 58 miles only. In England it is 15 miles and in the United States of America it was 25.1 in 1920 and 30.4 in 1926.

†This would only be applicable to loading open cars.

‡In 1910 1 in 553 shunters employed were killed and 1 in 10 injured. The total shunters employed was 13,381.

§British mileage is practically stationary while that of the United States increases at an average of 400 miles per year.

four times its original volume, also with a considerable fall in rates as well. Rates have fallen as follows :—

	Year 1906	Year 1916
Passenger fares	Yen 0.0155 per mile	Yen 0.0134
Goods rates	„ 0.0199 per ton mile	„ 0.0166

In other respects the following statistics indicate at least that government control has done no harm :—

Year 1906	Average total load per goods wagon	7.1 tons.
„ 1916	do.	9.9 „
„ 1918	do.	11.6 „
Year 1906	Average load per train 71 tons—Number of cars	20
„ 1916	do. 128 „ — do.	28
„ 1918	do. 142 „ — do.	28

The above figures speak for themselves.

Again the government railways of China were uniformly and increasingly prosperous up to the year 1918 in spite of the fact that the system of foreign loan agreement, under which the railways have been constructed, tends towards uneconomic de-centralization and plurality of officials. There are for instance in a system totalling 3,465 miles 14 separate administrations ascribed mainly to this cause yet the return on capital invested was 10.9 per cent. for the year 1918. The Peking-Mukden Railway, the nucleus of the system, has paid dividends of the order of 20 per cent. since 1905. Since 1918 continued war and military interference during the short periods of quiescence have ruined the entire railway system.

The system of nationalization has also been applied to the railways of South Africa. They are solvent and pay dividends which have risen from just over 3 per cent. in 1914—a slump year—to just under 5 per cent. in 1916, which is a better return than that provided by British railways.

Unquestionably nationalization would eliminate much competitive and wasteful construction, it would do away with traffic canvassing, and reduce enormously the cost of advertisement while considerable economics could indubitably be effected in personnel. Thus there is very little question that the numerous privately owned stations serving each of the great cities of the country are an extravagance as much now as when built, for they occupy much wanted land and must be very costly in the matter of interchange traffic. There is little question that they would never have been allowed under a centralized control.

The great benefit of nationalization would be the introduction of co-operative working between the railways and the common use of rolling stock. The system of private wagon ownership must be eliminated for efficiency of working and economy of national capital. Further there is unquestioned need of centralized control of routes to be followed and ports of destination to ensure economic distribution of work for the railways and the avoidance of unnecessary congestion.

Under the stimulus of a Great War we are said to have revolutionized our industries and we should do well to immediately follow the American example of 1866 and apply the same process to the railways. Since that date though there have been set back as when the United States Government acquired control of the railways during the War period, there has been a continuous upward trend in railway operation efficiency. The following table of performance ratios for the United States railways indicates that the slackness which was characteristic of War Management, which ceased in 1920, has been tackled and eliminated :—

Freight Service Performance	*1925*	*1924*	*1923*	*1922*	*1921*	*1920*
Freight car-miles per car day ...	28.3	26.8	27.8	23.5	22.4	25.1
Net ton-miles per car day	493	471	510	424	389	498
Net tons per loaded car	27.0	27.0	27.9	26.9	27.6	29.3
Net tons per train	744	715	713	676	651	708
Gross tons per train (exclud. locom. and tender)	1670	1588	1539	1464	1435	1443
Freight cars per train	43.8	41.7	39.9	38.4	38.4	36.6
Freight train speed (Miles per hour)	11.8	11.5	10.9	11.1	11.5	10.3
Freight locomotive-miles per locomotive day	58.2	55.3	60.3	52.0	49.5	65.3
Net ton-miles per train hour ...	8773	8222	7770	7479	7506	7302
Gross ton-miles per train hour (exclud. locom. and tender) ...	19679	18257	16764	16188	16555	14877
Fuel consumption per 1,000 gross ton-miles (exclud. locom and tender) ... ...lbs.	159	170	183	186	185	197
Passenger Service Performance.						
Passenger locomotive-miles per locomotive day	110.3	108.5	108.6	101.7	103.4	116.6
Fuel consumption per passenger train car-mile ... ...lbs.	16.1	17.0	18.1	17.9	17.7	18.8
FINANCE.						
Operating Ratio ... ... %	74.1	76.2	77.7	79.3	82.6	93.7
Rate of Return on Investment %	4.85	4.33	4.48	3.61	2.92	0.09

As a nation Great Britain is slow to employ drastic methods, the case for war to the Knife against the private wagon owner appears to be fairly well established.

Without railway efficiency our industries cannot be thoroughly efficient ; coal and transport are the life blood of a country.

Making Sponge Iron from Ferrous Sand in Japan

AN attempt is being made in Japan to utilise the large deposits of ferrous beach sand extending for about 70 miles, and averaging about 18 ft. in thickness, near Kuji, on the eastern coast of Japan, about 100 miles from the northern point of the main island. One estimate, made by Government engineers in 1921, placed the total of such sand in one area of 22 sq. km. at 150,000,000 tons. The most conservative estimates give the entire area a minimum of 200,000,000 tons of ore. Others state that the field could fill Japan's present requirements of 2,000,000 tons of iron a year for several centuries.

The prosess, which has recently been put into operation at the Kuji Iron Works, consists in the reduction of the common oxides of iron—hematite, limonite, magnetite and the residues from the roasting of iron pyrites—at a temperature low enough to prevent the melting of any of the iron or other constitutents of the iron ore. This temperature lies between 500 and 1,000 deg. C. No flux is used.

The beach sand is charged continuously through pipes to an annular hearth or sponge-iron furnace. Coal, which has been partially distilled to drive off moisture and light volatiles, is charged with the beach sand in the approximate proportions of one part of coal to four parts of beach sand. The annular hearth rotates slowly and heat is applied from 72 carborundum tubes installed immediately above each hearth. Gas is burned in these tubes, but the waste gases do not mix with those formed over the rotating hearth so that there is no danger of exoxidisation of the particles of iron after they have once been reduced to the metallic state.

The rotating hearth is 12 ft. wide. As ore and coal pass across it they are mixed and the iron oxide is reduced to metallic iron. The particles of iron are the same size as the particles of ore. The time required for the charge to pass across the hearth is about 30 min. The finely-divided metallic iron, together with the waste material in the original beach sand and the excess coal, is discharged continuously into revolving cylinders, rotating in water to cool the material to atmospheric temperature, to prevent the finely-divided iron quickly burning back to iron oxide, which would occur if the temperature of discharge were too high. This cooled material is then passed over magnetic separators, where the metallic iron (and a certain proportion of ilmenite, which is magnetic), is separated from the waste material. The ilmenite which is carried over reduces the grade of the iron somewhat. There is no particular disadvantage to this other than that the ilmenite must be charged into the melting furnaces later.

The finely-divided iron, commonly known as sponge iron, is then briquetted in special presses at 40,000 to 50,000 lbs. per sq. in. pressure, the resulting briquette having a density about 75 per cent. of that of solid iron, permitting it to be charged directly into open-hearth furnaces and insuring the sinking of the briquette below the slag line. The temperature of the reduction is sufficiently low to prevent the reduction of phosphorus from its mineralogical compounds and thereby eliminates one of the most troublesome ingredients in many iron ores. The low temperature also prevents the reduction of titanium from the ilmenite, a feature considered highly desirable in the Kuji process. The result is a very pure wrought iron with no combined carbon present and without combinations of phosphorus or titanium. In order to make steel, sufficient pig-iron is added to produce the grade of steel desired. There are two furnaces, each capable of producing 50 tons of sponge iorn per 24 hours.

Manchuria's New Railways

Five Important Railways Constructed or under Construction in the Past Two Years—New Lands Opened up for Economic Development and Settlement by Chinese Immigrants from Southern Provinces

Charles K. Moser, Chief, Far Eastern Section, Division of Regional Information

THE immense tide of Chinese immigrants pouring into Manchuria from the more southern Provinces, and the outstanding prosperity of the region as contrasted with the economic disorder prevalent over the rest of China, have served to bring again to the attention of the western world the remarkable program of railway expansion that is taking place there. While railway development in China proper stagnates, three nations—China itself, Japan, and Russia—are displaying exceptional activity in the construction or planning of new Manchurian railroads.

Most of the lines projected, or in course of actual construction, have been planned to open up the lands they are to traverse for economic exploitation and settlement by the new colonists; but the possibility of advantages other than economical has not, in some instances, been overlooked.

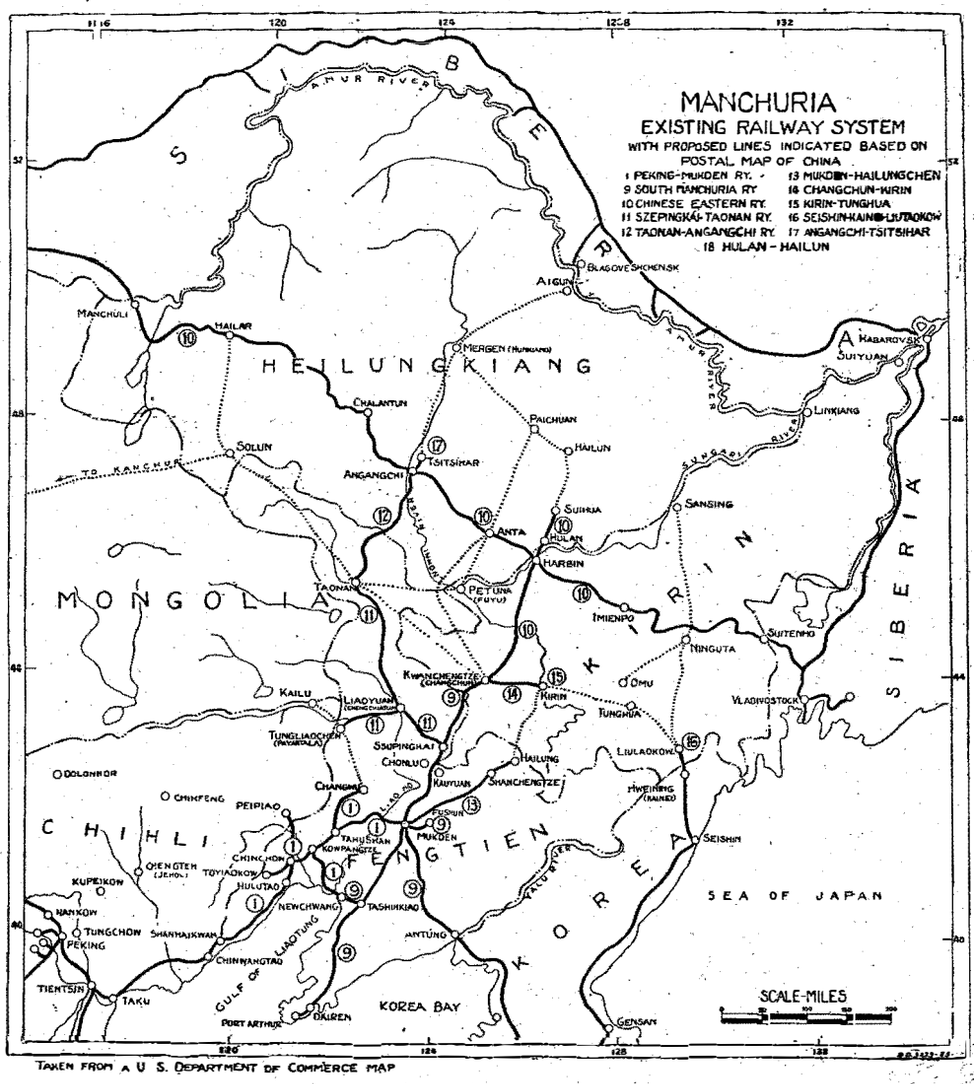
Manchuria embraces the Three Eastern Provinces—Fengtien Kirin, and Heilungkiang—in an area of over 265,000 square miles. Its soil generally is of almost exhaustless fertility and it possesses immense potential resources in agriculture, timber, and mineral wealth. In 1920 the total production of north Manchuria alone was estimated at a value of $320,000,000. Soya beans, wheat, millet, and kaoliang are the principal crops raised, but the cultivation of sugar beets and the breeding of livestock are of growing importance. While industrially undeveloped as yet, there are in the larger cities modern flour mills, bean-oil mills, soap works, sugar refineries, sawmills, distilleries, breweries, glass factories, and tanneries. Although the population of Manchuria constitutes but 6 per cent. of the population of China, in 1925 Manchuria's total trade constituted 30 per cent. of the total Chinese trade.

Railway Development Attracts Vast Colonist Movement

Thirty years ago Manchuria had no railways and its population was less than 2,000,000. To-day its railways total nearly 4,000 miles—about as much as the whole of the rest of China—and the population, according to recent estimates, numbers over 27,000,000. Railway development has brought into Manchuria probably the greatest colonization movement that has ever taken place in history, in an area of similar size and in a similar length of time. In one month, March, of the current year approximately 200,000 Chinese immigrants passed through the port of Dairen. Hitherto the movement has averaged around 400,000 immigrants per year, but for 1927 it is believed that the total influx will reach 1,000,000, 15 to 20 per cent. of whom are women and children. These are permanent colonists.

Railway construction in China at present is practically confined to Manchuria. Military activities and political uncertainites, combined with lack of funds, are the retarding factors. In Manchuria, on the other hand, at least five principal lines have been in process of constuction during the past two years.

Among them one of a perhaps purely economic character is the Hulan-Hailun Railway, commonly referred to as the Hu-Hai line. From Sungpu, on the Chinese Eastern Railway and directly across the Sungari River from Harbin, this road runs northward through the fertile valley of the Hulan River, one of the richest wheat-producing areas of Manchuria. It has now been completed through Hulan to Suihua, a distance of 70 miles, but the work is being extended 50 miles farther to Hailun. This road is a purely Chinese project, financed with Chinese capital, under the direction of Governor Wu of Heilungkiang Province. It is claimed that the whole line has been built with excellent trackway, permanent buildings, and big bridges, and equipped with the best of American-type rail stock, at a total cost of but $20,000 per mile. During the summer of 1927 a portion of the line was badly damaged by floods in the Hulan Valley, and traffic on the completed stretch is impeded by repairs while new construction is being held up.



TAKEN FROM A U. S. DEPARTMENT OF COMMERCE MAP

The Hu-Hai line is often discussed as the first link in a projected Harbin-Hulan-Hailun-Mergen-Aigun railroad, the concession for which, under the term Pin-Hei Railroad, was once, in 1916, granted to the Russo-Asiatic Bank. Such a line would link up Blagovestchensk, Siberia's important wheat centre on the Amur River, with Harbin, and dominate an agricultural territory of more than 60,000,000 acres, suitable for cultivation. The present cultivated area is estimated at about 8,000,000 acres, with a population numbering 3,000,000 and grain exports are placed at 1,000,000 tons.

Tahushan-Tungliao Railway

Another important railway in course of construction is the extension of the existing

Tahushan-Changwu branch of the Peking-Mukden Railway from Changwu to Tungliaochen (Payantala). Its completion will bring into existence the whole southern section of the old Chinchow-Aigun project, for the construction of which an American concession was obtained in 1910 and subsequently allowed to lapse. Work on this 90-mile stretch is at present proceeding actively under the supervision of the Peking-Mukden Railway. It is expected that all earthwork will be completed in 1927 and the road opened to traffic the following year, if no untoward conditions are encountered. It traverses a country at present sparsely inhabited but admirably fitted for agricultural settlement as well as for cattle raising.

The completion of this road will provide an all-Chinese line from Angangchi, on the Chinese Eastern Railway in North Manchuria, to the potential port of Hulutao. Some opposition to its construction has been encountered, since it will parallel for a considerable distance Japan's South Manchuria Railway, and provide an all-Chinese competitive outlet for the region now covered by the Ssupingkai-Taonan Railroad and its projected extensions.

Mukden-Hailungchen Railway

A third line, opened September 3, 1927, is the Mukden-Hailungchen Railway, which is to be extended northward from Hailungchen to Kirin, about 90 miles. This extension is being constructed by the Chinese authorities of Fengtien and Kirin Provinces, and completion during 1928 is anticipated.

Opposition to the construction of the extension to Kirin is also being encountered, on the ground that it parallels both the South Manchuria and the Changchun-Kirin roads. It is feared that if the provincial authorities bring to accomplishment the passage of their line across the zone of the South Manchuria Railway at Mukden, thus linking it with the Peking-Mukden line, it, too, may become a feeder of the proposed all-Chinese railway system terminating at Hulutao. Not only would this interfere with the economic control imposed by present railway systems in Manchuria, but it would tend to face the whole Kirin productive area economically toward the south, whereas plans have been made to give this territory an outlet toward the east by a line from Kirin to the seaports of northern Chosen.

Kirin-Chosen Railway

Both Soviet Russia and the Chinese authorities at Peking, it is reported, have been informed that the Kirin-Tunghua-Kainei (Hweining) railway project, which has been in abeyance for 10 years, is now to be pushed through to completion by Japanese capital. This line consists of two sections: The Kirin-Tunghua, 150 miles long, which is actually under construction, and the Tunghua-Kainei section of 75 miles, which is still on paper. The whole road traverses difficult country, and even on the Kirin-Tunghua section, where the Sungari River has been successfully bridged, track already laid for about 25 miles out of Kirin, and most of the earthwork completed, the tunneling is so extensive that the line will not be opened until October 28. At Kainei, on the Chosen border, the road will meet a projection of the Chosen Railway from the ice-free port of Seishin.

In 1917 Japanese interests agreed with the Chinese to advance a loan of $10,000,000 for this project, China to build the line. Political circumstances later arose to prevent this construction, but the project is now being pushed to completion by the South Manchuria Railway, on behalf of the Chinese. The new road will parallel the eastern branch of the Russian-Chinese-owned Chinese Eastern Railway and divert to the Chosen port a large amount of North Manchurian produce now carried to Vladivostok. The Seishin-Tsuruga (western port of Japan) sea route is about 400 miles shorter than that from Dairen to Kobe, so that one effect of the construction of the new railway might be to greatly stimulate the development of Japan's west-coast seaports. Opposition to the scheme, also, it is reported, has originated among the commercial interests of Dairen, which claim to see a large economic area faced away from their port by this railroad.

Taonan-Solun Railroad

This is a projected road to extend northwest from Taonan, avoiding the heavier grades of the Khingan Mountains, to Solun, a distance of 225 miles. It is then planned to continue northeast to Hailar, a great depôt on the Chinese Eastern Railway for the collection of wool, livestock, and hides and skins from the Mongolian nomads. The total length of the line as now planned is to be 350 miles. It will tap a great expanse of fertile and virgin country and provide a suitable jumping-off line for future railway extensions into outer Mongolia. The project is planned by the Chinese provincial authorities of Manchuria, and is at present in process of resurvey by Peking-Mukden engineers.

Opposition is being encountered to the construction of this railway owing to the fact that it will constitute another drain upon the territory of the Chinese Eastern, analogous to still another line now being surveyed by Peking-Mukden engineers for the Manchurian authorities. This line is also designed to start from Taonan, run *via* Fuyu (Petuna), at the junction of the Nonni and Sungari Rivers, and thence northward to Station Anta, the market town of the heaviest grain-producing area on the Chinese Eastern Railway.

Tungliaochen-Kailu Railway

Another project in process of survey, comparatively insignificant as to length but important because it crosses the boundary of Manchuria into the disputed Jehol specially administered district, claimed by both China and Mongolia, is the 50-mile extension northwest from Tungliaochen to Kailu. It might be regarded as the first step in the construction of an interior railway system into Jehol and Chahar. Future developments, furthermore, might establish Kailu as the leading junction point for a line from Dolonor, or perhaps Kalgan, with a north-and-south feeder for Hulutao.

Other Railways Planned

Several other projected railways, some still in their infancy, are worthy of mention. Among the most important is the line from Agangchi to Tsitsihar. This is the terminal, 22-mile section of the Taonan-Angangchi Railway. Special interest attaches to it because its construction is assured only after the surmounting of difficulties connected with the right to a crossing over the Chinese Eastern Railway's main line at Angangchi. The Chinese Eastern finally yielded to representations of the Peking Government in August, 1927, and agreed to a viaduct crossing. The line is to be built by the South Manchuria Railway and should be completed in 1928.

Construction of a proposed railway from Tsitsihar to Aigun would be a materialization of the Chinchow-Aigun project of years ago. As planned, the line will extend from Tsitsihar to Aigun *via* Mergen, a distance of 270 miles. Surveys of this route were made first under the American concession rights, and, later, in accordance with the concession terms granted the Russo-Asiatic Bank in 1916. Indications are now that actual construction is about to be started, Japanese capital and direction to do the work for the Chinese.

There remains a number of other projects of more or less interest in the various Russo-Japanese-Chinese schemes of railway development, but they are as yet on paper. Some of them are unlikely to come to actual construction until questions involving other than purely economic considerations have been brought nearer to settlement. Commercial Attaché Julean Arnold states, however, that it seems likely that during the next 10 years there will be an additional four or five thousand miles of new railways constructed in Manchuria.

Tokuyama Steel Sheet Company.—The Osaka Teppan Seizo K. K. (Osaka Sheet Iron Manufacturing Company, Ltd.) is planning to organize a new company to be known as the Tokuyama Teppan K. K. The new company is to have a capital of Y.5,000,000 and will take over the Tokuyama Mill of the Osaka Teppan Seizo at Y.3,000,000 for trade marks, equipment, good will, etc., while an additional Y.1,500,000 is to be expended in new equipment which will double the present capacity of the factory.

Equipment now installed in the Tokuyama Mill includes two Primary Rolling units, four Finishing Roll units, two Cold Rolling units, for the manufacture of sheet iron from No. 16 to No. 28 gauge, average daily capacity about 20 tons. The productive capacity of the mill will be increased to double this figure. Some reports say production will be increased to 3,500 tons a month, but this figure seems rather high.

Iwai and Company, Ltd. are closely connected with the Osaka Teppan K. K. and this newly planned subsidiary.

these conditions, as practically all the ground has to be laboriously dug out and carried away by hand. Proposals are on foot, however, to deal with this loss in limestone country, even when operating by bucket dredges. The gradual exhaustion of the workable areas on the flat country will lead to more attention being paid to the hills.

"It is conceivable that in the future, with tin at a sufficiently attractive figure and an abundance of cheap power, those hills which contain workable deposits of ore will be mined by water under pressure, the tin ore recovered, and the tailings sent down to the valley below, where they will be impounded. The opportunities of discovering more lode deposits will be thus greatly enhanced by the removal of the alluvium."

Coal, Gold, etc.

A deposit of coal in Selangor has been developed on sound lines. The product was invaluable during the war, when foreign coal was either unobtainable or prohibitive in price. It is comparatively young coal and occurs in two distinct beds of 40 and 25 feet thickness respectively. The proved area is about 200 acres. The coal is of fair quality and has a calorific value of about three-quarters of that of Cardiff coal. It is thus described :—"It has a pitch-black color and breaks with a conchoidal fracture. It is fairly hard, and has a specific gravity of 1.2-1.3., It does not coke and burns with a long flame." Its great characteristic however, is its tendency to spontaneous combustion, dur to exodization. The two seams are worked in two days. Originally an incline was sunk on the upper seam and the coal was worked by pillar and stall. It was found, however, that the liability to spontaneous fires was too great, and whole sections of the mine had to be bricked off in consequence. Recently a most successful method of sand filling was introduced, which enables the whole of the coal to be won by the long-wall method and eliminates all chance of fires. There is no gas in the coal.

Alluvial gold has been worked for centuries at various points in the Peninsula. Lode mining has attracted European capital, but, so far, the output has not been large. The Raub mine, in Pahang, is a low-grade proposition, and has been worked to a considerable depth. This is the only gold mine, as such, that remains of many, though it is quite conceivable that others may be reopened when transport facilities improve, and interest has already awakened in one or two other deposits. The Raub mine has now been working for over thirty years and produces about 14,000 oz. of gold a year. The average content of the rock is between 3 and 4 dwt. to the ton. The power is obtained from a hydro-electric power-station on some falls seven and a half miles off. About 16,000 h.p. are developed. The method of mining is the usual one of shafts and levels and the ground is taken by stoping. The ore is treated in the usual mill. New plant to treat the ore by the eyanide process has lately been erected. Gold is found along a belt of country stretching from the southern boundary of Negri Sembilan through Pahang into Southern Kelantan and Lower Siam. It is also found in Upper Perak in the head waters of the Perak River mixed with tin ore in the Bidor district to a small extent.

Wolfram is usually mined as a by-product with tin ore, though in certain places it is mined for its own worth, as in Trengganu and Kedah. It is found in veins and in mass and is usually mined by open-cast methods. Scheelite, calcium tungstate, is found usually associated with limestone. Where found in quantity it is mined by open-cast methods. Monazite is disseminated all over the country, but in small quantities, and is generally associated with tin ore, from which it is separated magnetically. China clay occurs in many places and is very abundant. It of of good quality, and is being successfully exploited Limestone occurs as large isolated masses, and is in a form that can be and is worked into marble of various colors. Phosphate is found in the caves in the limestone hills.

Railways in China and Manchuria

IN their report to the Department of Overseas Trade on the present situation in China (H.M. Stationery Office, Price 1s 6d.), Messrs. H.H. Fox, C.M.G., and H. J. Brett, H.M. Commercial Attaches at Peking and Shanghai respectively, describe the present deplorable condition of the Chinese railways. Practically every Government railway of any importance in China is now completely under military control and the bulk of its greatly restricted earnings diverted to military purposes.

At the end of June, 1927, railway communication between Peking, Tientsin and Shanghai had veen interrupted for months. The same remark applies to the Peking-Hankow and the Peking-Suiyuan lines, and the Peking-Mukden line, though it has functioned fairly regularly since Marshal Chang Tso-lin assumed control of Peking, is liable to be interrupted at any moment. The Lunghai has been closed to commercial traffic for over a year—the Shanghai-Nanking and Shanghai-Hangchow-Ningpo railways maintain with difficulty restricted services and the Chinese section of the Canton-Kowloon railway, after a series of acts of sabotage by insurgent Communists, is just able to run one train a day each way. It is a common sight to see heaps of cargo piled mountain high in Chinese railway stations awaiting transport (and in the case of native produce rapidly deteriorating) while long lines of empty cars made up of rolling-stock from half a dozen different railways lie idle on the sidings in charge of a rabble of unkempt and tattered soldiers, often little more than boys, who eat, sleep and perform their perfunctory ablutions in what were once the spick and span sleeping and dining cars of China's express railway services. This is the fate that has befallen the famous Blue trains—ordered in America during the great war through a British firm and never paid for—which at one time assured a quick and comfortable service between Peking and Shanghai.

As each military commander naturally requires all the rolling-stock that he can lay his hands on — especially when carrying out one of his periodical strategic retreats—he is averse, even when no fighting is in progress and the long-suffering civil administration is doing its best to start a restricted service, to allowing any of his cars to go beyond his section, lest they should never return, so on many lines the unfortunate merchant, having paid heavily for the transport of his goods at the point of departure, finds himself obliged to unload and reload half way down the line and make fresh and equally costly arrangements for their further progress to destination.

Under these circumstances it is hardly surprising that China's railways—with the exception above-mentioned—are now practically useless for commercial transport purposes; that the lines themselves—locomotives, rolling-stock of all kinds, and even permanent way—are steadily deteriorating; and that their meagre earnings, after the payments of forced military contributions, are barely sufficient to cover the cost of very inadequate maintenance.

On the other hand, Mr. Oswald White, H.M. Consul at Dairen, reports that railways in Manchuria, under Japanese influence, are making steady progress. The Mukden-Hailung line has reached Shanchengtzu, some 30 odd miles short of its objective, and it is anticipated that the whole line will be completed in a few more months. A branch line to Hsian, where there are coal deposits, is planned. The branch line from Tahusham (Peking-Mukden Railway) to Changwu, an important garrison town, has now been completed; an extension is planned to Tungliao (Paiyintala) on the branch line from Chenchiatun. In North Manchuria the railway which is to connect Harbin with Hailun has made considerable progress. In the Leased Territory the railway from Chinchou on the South Manchuria Railway to Pitzewo is to be completed in 1927.

On the South Manchuria Railway the returns for the last two years are as follows :—

	1926-27.	1925-26.
	Yen.	Yen.
Gross receipts	107,920,000	97,400,000
Expenditure	40,450,000	35,040,000
Net revenue	67,470,000	62,360,000

There was an increase of yen 5,600,000 in freight receipts, which were mainly responsible for the remarkably prosperous year enjoyed by the company. To cope with the constant development of goods traffic, the southern half of the line is being levelled out, and the track and bridges strengthened to allow of longer goods trains being hauled.

F: 14/五/28

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

上海仁記路拾六號

TWENTY-FIVE YEARS

SLIPPERY DIPLOMACY

AMERICA'S FAR EASTERN POLICIES

MR. MACMURRAY'S BRILLIANT VICTORY

HUMANITARIAN INTERVENTION

Vol. XXIV | April, 1928 | No. 4

"The Subsidiary Enterprises of the South Manchuria Railway"

By Henry W. Kinney

UNTIL a few decades ago, Manchuria was industrially in a very primitive state. It has become important partly through introduction of modern machinery and methods for handling products which had in the past been manufactured by very crude and wasteful process, and partly by the establishment of numerous new industries by which use is now being made of raw materials which formerly were not used at all.

In this work the South Manchuria Railway has taken an outstanding part by the establishment of various research and experimental institutions, such as the Central Laboratory and Geological Institute in Dairen and others. Numerous scientists in its employ have combed Manchuria in search of materials which might be manufactured profitably, and have developed manufacturing processes. In many cases the company has been the pioneer in establishing factories in which new industries have been given a start; then turning such over to private enterprise as soon as they were able to stand on their own feet, and in this way an example has been set and an impetus given to many on the new industries of Manchuria by which many thousands are employed, thus adding materially to the prosperity of the population and the country generally.

Bean Oil

Even the crude native bean oil mill is rather new in Manchuria, the first having been established about 70 years ago. The first steam plant was introduced by an Englishman in Newchwang in 1896, but the actual establishment of bean oil milling on a large scale followed the advent of the Japanese, and subsequently numerous improvements have been made in manufacturing methods which have contributed largely to the growth of the industry. Dairen, where not a single bean mill of any kind existed in the Russian days, is now the center of this industry, though modern mills are also found elsewhere, and many hundreds of fairly primitive native mills scattered throughout Manchuria manage to operate very profitably.

Flour in North Manchuria

Flour milling is mainly an industry of North Manchuria, where the principal wheat crops are found, but such mills are also operating in South Manchuria. This industry has seen great fluctuations, owing mainly to commercial conditions in the outside world, but as the native population of Asia is turning to wheat as a foodstuff in increasing degree, the flour industry offers considerable promise.

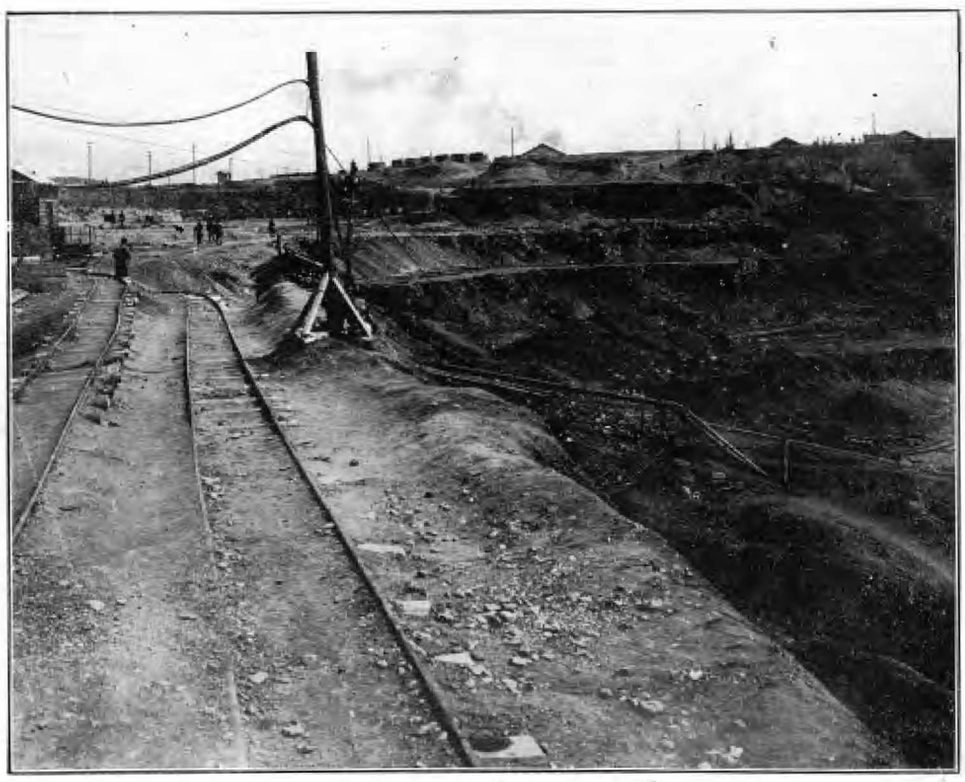
S. M. R. Laboratory

The part which the South Manchuria Railway, through the Central Laboratory and other agencies, has taken in the development of new industries, is interesting. The Central Laboratory not only renders assistance to private enterprise by furnishing analytical tests, estimates and the like, but it is constantly conducting investigations into various fields of research. An idea of the scope of its activities may be gained from the following eight divisions which it contains, namely, Analytical Chemistry, Applied Chemistry, Textile and Dyeing, Pottery, Fermentation, Sanitary Chemistry, Electric Chemistry, and Detail, in addition to which it establishes experimental workshops wherever it seems possible to develop any enterprise on a sound commercial basis.

Bean Iudustry

Among its activities have been the founding of a bean mill employing the chemical extraction system, and the numerous new uses of the bean, which have been enumerated already, have been due mainly to the researches of this laboratory. In 1910, an earthenware and procelain factory was established, which was later on turned over to private enterprise. This brought an entirely new industry to Manchuria which had in the past imported all its pottery, although abundant and excellent raw material is found at various points within its boundaries. Manufacture of fire brick and bricks of various other kinds has also been developed, as well as that of glass of various kinds, which has been extremely successful, especially as raw material of a high order is found near Dairen.

The numerous valuable industrial minerals which are found in quantity and variety in Manchuria, have been studied and various products manufactured therefrom, and similar work has been done whereby various new uses have been found for agricultural products, while several improvements in the method of handling the wild silk industry, which is of considerable importance, have been effected and imparted to the Chinese.



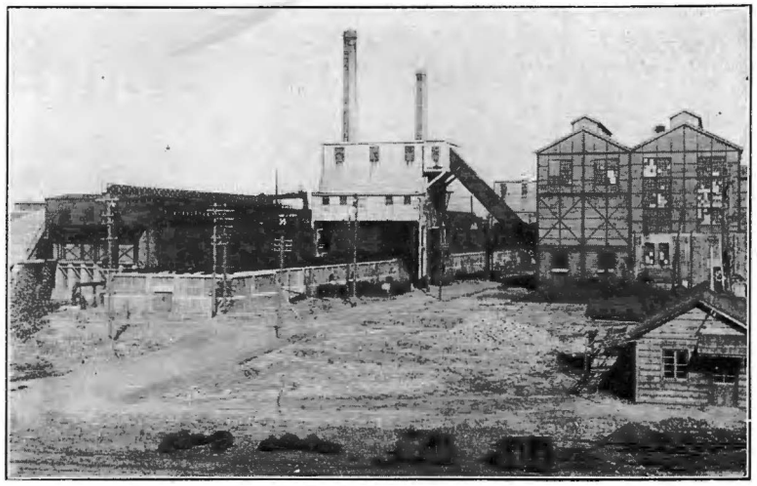
A Corner View of the Open Cut at the Fushun Coal Mine

Enormous Benefit

It follows that Manchuria has benefited enormously by these activities which have given value to many heretofore unused raw materials and have increased that of those which were formerly produced wastefully and crudely by means of primitive methods. Numerous manufacturing enterprises have been developed, such as sugar manufacture, spinning mills, etc., in which Chinese, Japanese, and foreigners engage, and employment has been furnished to many thousands, all of which has, of course, added enormously to the material wealth of the country.

Fushan Mines

The Fushan coal mines, which form one



Coke-Ovens, Anshan

of the principal assets of the South Manchuria Railway Company, are located about twenty miles east of Mukden and are connected by rail with the main line. This coal field, which was acquired in 1907, covers some 16,500 acres, nearly ten miles from east to west and 2½ miles from north to south, with veins ranging in thickness from 78 to 420 feet, the average being 130 feet. The impurities do not exceed 20 feet in total thickness, and the total coal content is estimated at over a billion tons, of which up to the present 50,000,000 tons have been mined.

Open Cut Mining

These deposits were originally discovered some 700 years ago by Chosenese who worked them in a very primitive way, but later the Manchuria Government forbade further operations as they feared they might interfere with the spirits of departed imperial ancestors whose graves were in the vicinity. When the Russians entered Manchuria they took up mining here, but the scale was so limited that the daily output was only 350 tons. Under Japanese management, extensive improvements have been made and numerous modern methods introduced, about Yen 51,000,000 having been invested in this connection. A number of pits have been sunk and the spectacular "open cut" opened whence huge amounts of coal are stripped, which has increased production to the point where the output in 1926 was 5,737,306 tons, which will be increased by 1932 to 8,000,000 tons annually, which will constitute the practicable maximum. It is thus expected that mining can be continued for another 85 years. It is estimated that about 200,000,000 tons may be taken out by the stripping methods by which the recovery is about 100 per cent, while the remaining 750,000,000 tons must be taken out by the hydraulic stowage system, though which from 60 per cent. to 70 per cent. may be recovered.

High Quality Coal

Fushan coal is bituminous, of high quality, and suitable for locomotive and marine engines, being also excellent for gas making. A Mond gas producer plant has been established which generates electric power and also produces a large quality of sulphate of ammonia as a by-product, and coke ovens are also maintained. The coal is being used on the South Manchurian Railway, and large quantities are exported, while the growing demand for coal as a fuel by the inhabitants of Manchuria accounts for a large consumption locally.

Oil Distillation

An important industry which is being developed in connection with the Fushan mines, is the distillation of oil from the shale deposits which are estimated to amount to about 5,500,000,000 tons, and as this shale must be taken out in connection with the coal mining operations, this raw material is virtually costless. After various experiments with systems used abroad, the Fushan experts invented a new process which recent experiments have shown to be highly successful. Plans have been made for a plant capable of handling 700,000 tons of shale a year, from which it is expected will be produced 50,000 tons of heavy oil, and 1,000,000 gallons of volatile oil, as well as paraffin and ammonia.

The Yentia coal mine, about ten miles north-east of Yentia station, with which it is connected by rail, is about 3½ miles long by one mile in width, with an estimated deposit of 20,000,000 tons. This colliery began operations in 1910, and its output in 1926 was 138,248 tons.

These coal mines form one of the most important sources of revenue for the South Manchuria Railway, as may be seen from the fact that in 1926 the total revenue was Yen 68,447,274 against an expenditure of Yen 59,418,780.

With the development of the Fushan mines, a large and modern town was built, but as it was discovered that it has been located over a valuable coal seam, which is to be exploited by the open cut system, it became necessary to move it and the work of rebuilding the town on a new site is now in course of progress.

Anshan Iron Works

In 1909 officials of the South Manchuria Railway Geological Institute discovered the presence of iron deposits at and about Anshan, and about six years later development thereof was made possible through a treaty with China. A site of about 4,540 acres was purchased for the plant and the modern town which has been built there. While the ore reserve is large, being estimated at about 300,000,000 tons, most of the ore is of rather poor grade, averaging from 35 to 40 per cent. of metal to the ton. The richer grades, averaging some 52 per cent, are scattered in small deposits, most of which have already been worked.

The first pig iron was produced in the spring of 1919, but as the price of iron which had been abnormally high during the war years, soon fell considerably, the high hopes originally entertained were to some extent disappointed. Iron is, however, a most important commodity to Japanese industry, only very small deposits thereof being found in Japan, and the South Manchuria Railway therefore continued to develop the plant although this involved a heavy financial loss at the time. Over Yen 45,000,000 has been spent on the plant, which contains two blast furnaces, each capable of producing 250 M.T. a day; four coke ovens, each with a capacity of 130 M.T. a day; gas works, electric plant, etc.

Economy Problem

The principal problem before the management consisted in devising methods for handling economically the low grade ores which form the greater part of the deposits. After considerable study, one of the Japanese experts attached to the plant invented the so-called hematite reducing system and magnetic concentration method. A large concentration plant was built which provides a preliminary treatment of the ores making it possible to recover their metal content ceonomically. The annual pig iron output of the plant was 88,163 tons in the fiscal year ending March, 1926, but the production is to be increased to 200,000 tons annually.—"Osaka Mainichi."

General View of the South Manchuria Sugar Refining Co., Ltd., Mukden

Engineering Notes

D. M. Kable Returns to China.—Mr. D. M. Kable will be on his sixth trip to China during the month of April, Mr. Kable well known in the engineering world as consulting, mechanical and technical engineer. His company has installed a number of industrial plants in Japan, China, Indo-China and Singapore. He will bring with him many new and interesting methods applicable to Chinese industry and in particular the metal industry in general, and up-to-date information as to the manufacture, packing and wrapping of food products and cosmetic preparations.

D. M. Kable & Company will re-establish their Shanghai office in the near future and will have a resident engineer specializing in ventilation, refrigeration, hydraulics, etc., who will be well qualified to give practical advice in the handling of industrial and engineering problems.

Messrs. Edgar Allen & Co., Ltd.—According to advices from Messrs. Edgar Allen & Co. Ltd., Sheffield, tests made by the Sheffield Testing Works prove that each of their three high speed steels made by the new process is conspicuously more efficient than the same steel made by the old process.

"Sulzer" Boilers for Japan.—The Kobe Office of Sulzer Brothers booked an important order for a Garbe boiler plant for the Karafuto Kogyo K.K. Estori Mill, comprising :—

3 *Double-Bank Sulzer Upright Water-tube Boilers*, each of 4,300 sq. ft. heating surface and for 28½ atm. (405 lb.) working pressure, with superheaters, travelling stokers, boiler-feed pumps, etc.

This order is all the more gratifying as the competition met with was again exceptionally severe, both from Japanese and other firms. The Karafuto Kogyo already possesses two Sulzer boiler plants, one at Karafuto of—

4 *Sulzer Upright Water-tube Boilers*, each of 3,000 sq.-ft. heating surface, working pressure 17½ atm. (250 lb.) and the other at Sakamato of—

3 *Sulzer Upright Water-tube Boilers*, each of 2,420 sq. ft. heating surface, working pressure 14 atm. (200 lb.).

Edgar Allen's Stag Major.—The very rapid progress made in the design and strength of modern machine tools has rendered it imperative that the metallurgist should provide a material capable of withstanding the very severe work to which high speed steel tools are submitted.

For a number of years there has been a determined struggle for supremacy between the designers of machine tools and the steel maker, and until recently the machine tool makers were slightly ahead of the metallurgist. Edgar Allen & Co., Ltd., had, however, been carrying out researches with the object of providing a steel that would task the lathe to its utmost limits, and thereby obtain maximum efficiency from the most modern machine tools in existence. After many careful investigations and numerous experiments they designed a steel which gave the desired results.

In order to produce this superior steel it was found necessary to make further additions of very scarce and expensive alloying elements, which necessitate special methods of production and very careful preparation. The increased percentages of the important elements referred to made desirable the employment of special melting apparatus in order to obtain satisfactory results. It was imperative that the heavy elements contained should permeate the molten metal and create a homogeneous mass. This was only rendered possible as a result of Edgar Allen & Co., Ltd.'s introducing into their works *a new high frequency electric furnace*, which has created a geat sensation amongst steel makers, and is *the first furnace of its kind in the world producing high quality tool-steel on a commercial basis*. The molten mass of high grade pure base metal is kept constantly on the move owing to the complex electrical field in which the materials exist. This has the very important advantage of maintaining complete homogeneity throughout the mass.

Kanegafuchi Boseki K. K.—(Kanegafuchi Spinning Co., Ltd) Naruno Mill. In connection with the plan to install an additional 20,000 spindles at the Naruno Mill in Osaka, this company has concluded a power supply contract with the Ujigawa Denki K.K. The rate is reported to be much lower than the generating cost at the plant. In view of this advantage, the spinning company has decided to abolish its own steam power plant, now generating 1,650 kw. and instead to buy a total of 3,000 kw. hydro-electirc power from Ujigawa, including 700 kw. already contracted for and 500 kw. recently contracted for extension purposes.

Machinery required for changing receiving equipment will be ordered from the Mitsubishi Denki K. K.(Mitsubishi Electric Machinery Co., Ltd.). It is also reported that the power contract was competed for as usual, between Nippon Denryoku K.K. and Ujigawa Denki K.K., resulting in the victory of the latter.

Shanghai-Nanking Railway Revenue in 1927.—The following shows the monthly revenue in dollars of Shanghai-Nanking Railway during the year of 1927 as compared with that of 1926 :—

Month		Passenger Number	Passenger Fares	Freight Tons	Freight Revenue	Other Items	Monthly Total
January	1927	997,134	571,104	82,759	136,872	8,094	716,070
,,	1926	936,023	533,009	142,121	205,309	15,020	753,338
February	1927	693,026	465,271	36,412	61,317	7,623	534,211
,,	1926	849,548	481,562	92,723	164,371	12,857	658,790
March	1927	291,592	336,140	4,804	7,878	5,520	349,538
,,	1926	1,046,659	561,707	138,288	215,823	11,494	789,024
April	1927	434,477	400,147	9,907	54,674	6,542	461,363
,,	1926	1,076,235	486,352	147,320	247,833	12,625	746,810
May	1927	739,824	552,308	35,120	48,507	7,555	608,370
,,	1926	1,020,825	545,624	144,806	237,300	13,009	795,933
June	1927	823,113	521,958	104,301	183,781	8,374	714,113
,,	1926	919,614	468,819	157,654	286,001	11,056	765,876
July	1927	841,079	516,061	106,338	178,393	11,244	705,698
,,	1926	890,361	491,444	183,194	291,393	11,115	793,952
August	1927	668,001	524,536	50,576	87,573	8,463	620,572
,,	1926	863,784	491,589	166,060	311,318	9,834	812,741
Sept.	1927	668,281	544,189	36,670	52,718	8,296	605,203
,,	1926	986,141	595,069	133,488	210,666	8,917	814,652
October	1927	830,262	646,055	58,615	103,485	8,832	758,372
,,	1926	975,674	581,987	119,190	192,905	9,784	784,676
Nov.	1927	830,782	708,573	86,212	132,183	10,857	851,613
,,	1926	887,686	517,945	72,501	115,323	8,324	641,592
Dec.	1927	834,469	830,607	85,713	140,533	11,705	982,845
,,	1926	857,424	513,726	56,614	90,959	8,762	613,447
Total	1927	8,652,040	6,616,949	697,427	1,187,914	103,105	7,907,968
,,	1926	11,309,974	6,268,833	1,533,959	2,569,201	132,797	8,970,831

Shanghai-Ningpo Railway Revenue in 1927.—The following shows the monthly revenue in dollars of the Shanghai Ningpo Railway during the year of 1927 as compared with that of 1926.—

Month		Passenger Number	Passenger Fares	Freight Tons	Freight Revenue	Other Items	Monthly Total
January	1927	297,223	363,705	29,030	43,077	3,711	410,493
,,	1926	450,791	254,103	84,385	119,756	5,479	379,338
February	1927	167,277	195,631	6,693	11,081	3,567	210,279
,,	1926	425,261	243,331	43,096	61,121	5,400	309,852
March	1927	178,157	117,857	8,026	10,810	3,458	132,125
,,	1926	578,109	318,312	89,008	130,137	5,940	454,389
April	1927	263,894	312,303	17,610	24,486	4,552	341,341
,,	1926	621,741	426,012	88,891	143,197	5,940	575,149
May	1927	400,277	307,034	46,724	77,741	4,418	389,193
,,	1926	532,910	348,504	94,556	146,934	6,375	501,813
June	1927	399,280	381,718	60,987	181,153	4,482	567,353
,,	1926	432,829	265,974	89,178	169,385	7,090	442,449
July	1927	387,986	295,559	72,980	140,217	3,410	439,186
,,	1926	429,464	270,983	86,561	143,521	8,376	422,880
August	1927	352,337	345,857	44,858	81,952	3,036	430,845
,,	1926	422,055	273,300	65,753	102,157	5,640	381,097
Sept.	1927	421,799	295,364	53,055	93,254	2,965	391,583
,,	1926	478,671	307,098	70,808	115,092	7,120	429,310
October	1927	392,075	417,765	58,625	100,582	5,217	523,564
,,	1926	395,236	248,003	61,674	92,832	4,299	345,134
Nov.	1927	377,662	294,960	67,232	115,947	3,967	414,874
,,	1926	403,919	204,136	54,492	88,195	3,460	295,791
Dec.	1927	345,951	294,773	65,613	115,653	4,050	414,476
,,	1926	313,324	306,435	38,300	58,544	3,074	368,053
Total	1927	3,983,918	3,622,526	531,433	995,953	46,833	4,655,312
,,	1926	5,484,310	3,466,191	866,702	1,370,781	68,193	4,905,255

New Roods in Kansu.—In a telegram to the Government Council, the Kansu Provincial Government reported that the construction of a motor road connecting Lanchow and Si-an, provincial capitals of Kansu and Shensi respectively, have been completed. The road will be open to traffic by the end of this month—(*Kuo Min News Agency*).

Nisshin Boseki to Move Mill and add Spindles.—On account of the replanning of the City of Kyoto into definite residence and factory districts, many manufacturing plants will be required to move their businesses to other parts of the city or outside the city limits. The Nisshin Boseki has decided to move its 20,000 spindle Kyoto Mill to Hamamatsu, and at the same time will add 10,000 spindles to the equipment. The work is to be completed, first part, by the end of the year.

Electric Power Development at Leeds.—Leeds Corporation Electricity Committee has recommended the City Council to accept the tender of the British Thomson-Houston Co., Ltd, Rugby, for the two double cylinder super efficient 25,000 kw. 3,000 r.p.m. turbo-alternators required for the new Power Station which is to be erected at Kirstall. The turbo-alternators are rated at 35,714 kva. 10500/11500 volts, three-phase, 50-cycles and the turbines are designed for a working steam pressure of 450 lb. per sq. in. gauge at 750 degrees F. temperature. The total value of the contract which was secured in the face of very strong continental competition is £176,504.

Aichi Prefecture Interest Plan Another Large Railway Company.—Local interests in Aichi Prefecture are planning a new electric railway between Toyokawa and Gamagori, in Hoi County. The company will connect with the recently established system (planned) of the Sanshin Tetsudo, but this company will complete construction before Sanshin.

This new line will improve transportation facilities to the raw silk centers in Nagano, as such material as coal can be landed at Gamagori and shipped from there to Okaya by way of Tatsuno on the Central Line of the Government Railways.

The Mikawa Tetsudo has almost completed an extension to Gamagori, and is reported to be interested in the formation of this new company, especially as the managing-director of Mikawa is also the managing-director of Ina Denki Tetsudo which is connected with the new Sanshin railway. The Aichi Denki Tetsudo also has plans for the construction of a harbor branch line at Gamagori, so there will be plenty of competition for the rights to construct any new lines in this district.

Mukden-Hailungcheng Branch Extension to Linkiang.—The *Manchuria Daily News* does not give a very encouraging account of the prospects of the proposed Nanchamuhulo-Hsingking-Tunghwa-Linkiang branch of the Mukden-Hailungcheng Railway, and points out that, once the line reaches the mountainous region, the small amount of produce for export will render it economically unworkable.

The section from Nanchamuhulo to Hsingking is now being surveyed, but the people of Tunghwa and Linkiang prefectures, with the support of certain officials, are petitioning the authorities to extend the branch into the region in which they are interested.

This proposed extension will start at Hsingking for Tunghua, over 320 Chinese *li* away. Then 20 Chinese *li* east of Tunghua it will have to negotiate the mountainous region from Tungchangtai and Sanhotzu, necessitating the construction of an extensive tunnel. It the line should pass through Sankoshu, Sanlusiling Pass will have to be coped with, and if Tzukou is to be passed, there is Tangtzuling Pass to be surmounted. Each mountain is 530 metres above the sea level and will have to be pierced through. About Yingkoku, a few tunnels will have to be excavated. At all events, tremendous engineering difficulty confronts the construction of this branch line. From Tunghua to Linkiang, the destination, the distance is 300 Chinese *li* from Tunghua to Toutaokou runs in a level country, but as the line proceeds eastwards to near Tungminglatzu and Lintzutao, mountains rise in rows one behind another, and another tunnel will have to pierce Tiengling Pass. The Hsingking-Tunghua section will tax engineering ingenuity to overcome still greater difficulties.

Chinese Engineering and Mining Company.—The figures in this report show that conditions in this company's territory improved considerably in the last twelve months. The restriction in sales of coal due to the limited facilities for transportation on the Pekin-Mukden Railway continued, but in the second half of the year, with additional locomotives and wagons, sales of coal expanded substantially. The total sales by the Kailan Mining Administration for the year amounted to 3,790,353 tons, compared with 2,898,107 tons, an increase of over 892,000 tons. The gross profit of the Kailan Administration, under which the mines of this company and another are carried on as a joint undertaking amounted to $9,504,716, against $5,336,409. After providing £52,560 for interest and £24,000 for redemption in respect of the Kailan 6 per cent. bonds, and reserving $1,425,707, against $800,461, for depreciation, the proportion which goes to the Chili Government is $314,260, and the net profit is $6,004,093, against $2,839,290, of which this company takes $3,322,938, as compared with $1,663,361. After crediting other income and deducting general expenses, including £36,658 for exchange (against £1,066), and £84,132 for income tax (against £93,920), the net profit is £230,831, which compares thus :

Year to June 30.	Net profit. £	Dividend tax free. £	%	Carry forward. £	Kailan coal sales. Tons.
1927	230,831	210,000	15	256,448	3,790,353
1926	141,688	140,000	10	241,109	2,898,107
1925	198,714	140,000	10	241,234	2,861,708
1924	473,093†	280,000	20	186,406	4,284,160

*Including £22,479 repayment of E.P.D. †Including £100,959 repayment of E.P.D.

Coal sales for the four months to October amounted to 1,452,000 tons, as compared with 1,031,000 tons for the corresponding period of 1926. Sales are only limited by the transportation facilities, and arrangements have been made for the provision of additional locomotives and 300 additional wagons. The financial position is very sound, and the outlook is improving. There are £864,000 6 per cent. Kailan bonds outstanding, which at 93 yield 6½ per cent. Capital is £1,400,000, wholly in £1 shares, which at 3, including the final dividend of 10 per cent., yield £5 3s. per cent., tax free, equal to nearly 6½ per cent., subject to tax. Meeting, December 7.

Sukawa Denryoku Plans.—The Sukawa Denryoku K. K. has been planning to construct two power stations for some time but the actual work has been held up pending the selection of the sites. It is reported that the location of the stations has now been decided upon and the work will be undertaken in the near future.

The first of the new stations is to be known as Matsuya, capacity 21,733 kw, water to be taken from the main stream of the Agatsuma River over a waterway 30,000 feet long to carry 850 cubic feet of water a second, which will be added to by 230 cubic feet a second from the discharge of the Nakagawa Station. The waterway will empty into a large reservoir with a capacity of six million cubic feet. Penstocks will be built from the reservoir to the power station 3,600 feet long. The effective head of the station will be 378 feet, discharge directly into the Agatsuma River.

Water for the other station planned, Nakagawa, will be drawn from the Su River, a tributary of the Agatsuma, over a 30,000 foot waterway. The water quantity at the station will be 230 cubic feet a second under an effective head of 800 feet.

The reservoir which is to be constructed in connection with these two stations will also later be utilized by the Hara Machi No. 1 station of 20,000 kw. and the Koidzumi Station of 13,000 kw, and by the Kanai Station of 11,000 kw (in operation) and the Hakoshima Station 10,000 kw (planned) of the Sukawa's connection, the Tokyo Denryoku K. K.

The Nakagawa Station will be constructed entirely by the Sukawa Denryoku itself. The contract for the construction of the Matsuya station has been let to Tobishima Gumi. The estimated cost of construction at Matsyua is Y.3,000,000 for civil engineering work, Y.1,500,000 for electrical equipment and about Y.3,000,000 for railway construction necessary, interest, etc., the total of Y.7,500,000 also includes the cost of some primary sub-station equipment. Equipment will include two hydraulic turbines of 15,900 h.p. each, two generators of 12,500 kw. and four 16,000 kva. transformer units.

The construction of the Matsuya Station is to be completed before the end of September 1929 and Nakagawa Station is to be finished before the end of 1931.

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THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路拾六號

遠東時報

TSINAN

A DOCUMENTED STATEMENT OF THE PRESENT CRISIS IN CHINA

THE DECLINE OF THE NATIONALIST GOVERNMENT

By GEORGE E. SOKOLSKY

MANCHURIA, THE CRUX OF SINO-JAPANESE RELATIONS

By K. K. KAWAKAMI

THE COTTON MILLS OF SHANGHAI

By H. F. WILKINS

TRADE IN THE PAN-PACIFIC AREA

Vol. XXIV May, 1928 No. 5

SHANGHAI, PEKING, TOKYO AND MANILA

General Tan Yen-kai, Chairman of the Nationalist Government Council :—

" Sir Eric Drummond,

" Secretary-General of the League of Nations,

" Geneva.

" On behalf of the Nationalist Government of the Chinese Republic, I, the chairman of the said Government, beg to draw your attention to the grave situation which arises from the despatching of large numbers of Japanese troops into the Chinese Province of Shantung, and their hostilities committed therein which amount to acts of war against China.

" On May 3, the Japanese troops at Tsinan, Capital of Shantung, fired upon Chinese soldiers and civilians without any provocation on the part of the latter, and then set gunfires on surrounding residential quarters with the result of more than one thousand casualties. What is more horrible is that a party of Japanese soldiers invaded the office of our Local Commissioner of Foreign Affairs at Tsinan, arrested him, and after having his ears and nose cut, shot him together with the members of his staff to death on the very spot.

" On May 7, the Japanese military authority at Tsinan sent a note with unreasonable and impossible demands to our Commander-in-Chief and set twelve hours for reply. Without waiting for our reply, the Japanese troops again started warlike actions in a more extensive scale, which have not ceased at the time of wiring. Besides, more Japanese landed and naval forces are being despatched to Chinese territories. In spite of all this, our military and civil authorities have throughout the time acted with utmost self-restraint in conformity with government orders.

" I, hereby, take the liberty to call your attention to the fact that the territorial integrity and political independence of China have been ruthlessly violated and the peace of nations is threatened by the aggression on the part of Japan. You are urgently requested to summon a meeting of the Council of the League in accordance with Paragraph 2 of the Article XI of the League Covenant. It is earnestly urged that the League shall request the cessation of hostilities on the part of Japanese troops and their immediate withdrawal from Shantung. As regards the final settlement of the whole affair, the Nationalist Government being fully conscious of the righteousness of its cause, is prepared to agree to any proper arrangement for an International enquiry or Arbitration.

(*Signed*) " TAN YEN-KAI,

Chairman Nationalist Government Council."

Appeal to President Coolidge

Then there is Nanking's appeal to the President of the United States :

" SIR,—As Chairman of the Nationalist Government of the Chinese Republic, I take the liberty to draw your attention to the fact that Japanese troops have invaded Shantung and are actually waging war against China.

" They have murdered our Commissioner of Foreign Affairs and his staff, and repeatedly fired upon our civilians.

" More Japanese troops are still being despatched to said province.

" We have throughout exercised the utmost self-restraint, trusting that the cause of International Peace and Justice is the common concern of civilized nations. Our people all remember that the final settlement of the Shantung question was effected through the good offices of friendly Powers, especially the United States of America. We desire to know the attitude of the American Government and people towards this grave situation created by Japan.

(Signed) " TAN YEN-KAI,

" *Chairman, Nationalist Government Council.*"

The Japanese *Toho News Agency* issued the following which may be accepted as authentic :

The Ultimatum to General Chiang

Tokyo, May 15.

General Chiang Kai-shek's reply to the Japanese army in Tsinan was the subject of an important conference, at the Foreign office yesterday, between the authorities of the Foreign, War and Navy Offices. The conference lasted eight hours.

It is understood that the following military demands were decided upon, and that instructions were telegraphed accordingly to Lieut.-General Fukuda, Commander of the Japanese forces in Tsinan, with the approval of the Cabinet meeting to-day :—

(1) Official apology by General Chiang Kai-shek.
(2) Severe punishment of General Ho Yao-tzu * and several other Southern commanders who are responsible for the outrages in Tsinan.
(3) The Southern troops who were disarmed and are now detained by the Japanese troops will be set free forthwith. Their arms will be returned at a future date, as found proper.
(4) Not only is fighting between Northern and Southern troops not permitted within a 20 li radius of Tsinan and Tsingtao and within 10 li on each side all along the Kiaochow-Tsinan Railway, † but Chinese armed soldiers, propaganda and military equipment will not be permitted in the above-mentioned areas until the situation has completely quieted down.
(5) For the purpose of conducting negotiations with the Commander of the Japanese forces, the Chinese representative shall produce General Chiang Kai-shek's official letter of authorization.

As to the damage suffered by Japanese residents and troops, the required compensation and apology, the Government, it is understood, intends to open negotiations with the Nanking Government.—*Toho.*

Use of the Shantung Railway

Tokyo, May 15.

At a Cabinet meeting to-day, held to discuss the conditions under which Southern troops are to be allowed to pass through Tsinan Station, it was agreed that :—

" As the Japanese Government has no intention whatever of obstructing the northward advance of the Southern troops, it will allow Southern troops to pass through Tsinan Station and proceed northward by the Tientsin-Pukow Railway if the Southern authorities show sincerity towards Japan, accept the five demands presented by the Japanese Army in Tsinan and give assurances that Southern troops do not harm Japanese and other foreign residents in future, though Japan cannot permit any Chinese troops to cross the Kiaochow-Tsinan Railway in view of the necessity of maintaining communications between Tsinan and Tsingtao."

Immediately following the Cabinet meeting, General Suzuki, Chief of the General Staff, gave telegraphic instructions to Lieut.-General Fukuda, Commander of the 6th Division in Tsinan.—*Toho.*

Japan Preparing Statement for League of Nations

Tokyo, May 15.

The Foreign Office has stated that a memorandum for the information of the League of Nations is being considered, but its nature and time of presentation have not been decided on.

It is understood that officials are at present busy collecting evidence for the purpose of refuting the allegations of the Chinese with regard to the cause of the incident.—Reuter.

The Truce

Finally, we publish Marshal Chang Tso-lin's appeal to the troops which was ignored by the Nanking Government :

Northern Troops Ordered to Cease Hostilities

Later.

Generalissimo Chang Tso-lin's circular telegram was sent this evening to all the leading civil and military authorities of the North and South.

The Dictator declares that civil war has been going on for several years and that communists have been attempting to ruin the country.

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* He has already been dismissed
† This has been done

R:13

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路拾六號

遠東時報

CHINESE COLONIZATION IN MANCHURIA

By C. WALTER YOUNG

NANKING'S MINISTERS OF FOREIGN AFFAIRS

BARON KIHACHIRO OKURA

JAPAN'S MEMORANDUM TO THE LEAGUE OF NATIONS

THE ECONOMIC SALVATION OF CHINA

Vol. XXIV | June, 1928 | No. 6

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Powers through the United States. Whether they can accomplish this or not, they have, at any rate, selected as their representative in Washington a diplomat who has to his credit that he has never sacrificed his country nor, at the same time, has he ever served as a tool of the Russians to destroy the just commerce of foreigners in China. Dr. Wu combines the fine qualities of an old-time Chinese scholar with the training of the West in the schools of the United States and Great Britain. His father was one of China's greatest diplomats, Dr. Wu Ting-fang, who, for many years, was the Chinese Minister to the United States and whose book "America" is an exceptionally brilliant analysis of social and political customs in the United States.

Dr. C. C. Wu was succeeded to the post of Minister of Foreign Affairs of the Nationalist Government by Mr. Huang Fu, who did not excite tremendous enthusiasm. He has now been succeeded by Dr. C. T. Wang, who is a Rotarian and a Mason and a diplomat, well known to Americans. Dr. C. T. Wang has not achieved political prestige through the Kuomintang, but has, in recent years, rather been associated with the Northern Government, where he served as Chairman of the Shantung Retrocession Commission which secured the return of Shantung from Japan, the Sino-Russian negotiations which wrote a treaty with Russia and he was Chairman of the Tariff Conference which met in Peking and of which Mr. Silas Strawn was the American member. In recent years, Dr. Wang has been regarded as a member of Marshal Feng Yu-hsiang's party, but his acceptance by the whole Kuomintang at the present time as Minister of Foreign Affairs, is another step in the direction of national unification. It is too early to praise the work that Dr. Wang will do as Minister of Foreign Affairs of the Nationalist Government because he has just been appointed, but he has had a vast experience in this particular field and even those who have, in the past, not regarded him with favor, feel that he should have every support in the very difficult position which he now fills.

Japan's Memorandum to the League of Nations

Statement of the facts and circumstances of the collision between Japanese and Chinese troops at Tsinan

On May 28 the Japanese Government submitted to the Secretariat of the League of Nations at Geneva the accompanying statement setting forth the facts and circumstances attendant on the recent collision between Japanese and Chinese troops at Tsinan, for the information of countries belonging to the League.

1.—On January 3, 1927, Chinese rioters, instigated by extremists, made an attack in great force on the British Concession at Hankow, and, defying British efforts to hold them back, occupied it. A similar outrage was repeated at the British Concession at Kiukiang on January 6, 1927.

The Southern Army entered Nanking on March 24. The Communist troops belonging to it attacked the Japanese Consulate and subjected the Consul, members of his staff and Japanese residents to indescribable insults and also inflicted bodily harm upon them. The Communist troops looted the Japanese Consulate and almost all the houses of Japanese residents so completely that practically nothing was left in them. Similar or even more serious outrages were committed on the Consuls of and residents belonging to other countries, and British and American warships were compelled to open fire as a protective measure.

On April 3, in the Japanese Concession at Hankow, a gang of rioters, who, at the instigation of Communist agents, had been attempting to provoke disturbances, began by purposely insulting and striking a Japanese seaman who happened to be ashore. They proceeded to attack Japanese shops and to injure Japanese passers-by. The situation became so critical that most of the 2,500 Japanese living in the Concession left for Shanghai or for Japan.

In view of such incidents transpiring alike at Nanking and Hankow, the Japanese residents at Chungking, Ichang, Shasi, Changsha, Wufu, Kiukiang and other places on the Yangtze began to quit those places.

On December 11 a collision occurred at Canton between Communist and non-Communist groups of Chinese troops, and did not come to an end until the thirteenth. Fortunately, foreigners in the Concessions sustained no harm; but it is to be noted that the cruelty, pillage and massacre (including that of women) which distinguished this fighting among the Chinese troops themselves defied all description. Even after the fighting was over, efforts were made to wipe out the so-called Communists, some 200 being daily arrested. They were summarily shot, without any formality, at three places in the city which were made to serve as execution-grounds for the occasion. The total number of people thus put to death is estimated at 2,500.

2.—The above instances constitute only a few, and the most glaring, of the incidents that have occurred in China during the past year. The state of affairs which for the last few years has prevailed in that country is, broadly speaking, of a piece with them. Since the First Revolution civil wars have continually followed one another, and have made it difficult for any peace and order to be maintained at all. During the last few years the activities of the Communists have rendered the general conditions still more disturbed. At present the situation is such that foreign residents cannot depend, for the protection of their lives and property, on the Chinese authorities alone. It is inevitable, therefore, that Japan, a country contiguous to China, the interests of which are profoundly involved and many of whose people live there, should, if occasion should require, endeavor to safeguard her people and her vested rights by her own exertions on the spot.

3.—When recently the Southern Army commanded by General Chiang Kai-shek was advancing northwards from Nanking in the direction of Tsinan, Japan dispatched her troops to Tsinan for the protection of 2,000 Japanese residents there. It need scarcely be said that this dispatch of Japanese troops was a measure of self-protection rendered unavoidable by the above-mentioned state of affairs prevailing in China.

In spite of this precautionary measure taken by Japan, some Southern soldiers looted a Japanese house. This outrage originated the whole incident. The Southern troops then at Tsinan proceeded to attack the Japanese forces and residents at various places. They murdered over a dozen Japanese residents including women, and plundered over a hundred Japanese houses. It is to be sincerely regretted that these outrages compelled the Japanese troops to resort to force for the protection of the Japanese residents.

If it should be thought that the present deplorable incident would not have occurred but for the dispatch of Japanese troops to Tsinan, such a view would obviously be erroneous in the light of the above-mentioned incidents at Hankow and Nanking, occasions on which no foreign troops were present.

4.—The present dispatch of the Japanese troops is for no other purpose but to protect the lives and property of Japanese residents, and implies nothing approaching an interference with the military operation of any of the Northern or Southern forces, and the troops will be withdrawn as soon as the necessity for their continued presence ceases to exist, as was announced by the Japanese Government at the time they were dispatched.

When a disturbed state of affairs came into existence at Tsinan last year, the Japanese Government dispatched their troops to that district in June in order to afford the necessary protection to Japanese residents. As soon as the situation became such that the presence of the Japanese troops was no longer required, they were recalled, their complete withdrawal having been effected by September 8.

5.—The following is a résumé of the Tsinan Incident:

(*a*) The Japanese troops, which arrived at Tsinan between the latter part of April and May 2, 1928, established as the object of their protection an area containing about 80 per cent. of the Foreign Quarter, which constitutes the principal place of abode for Japanese, and erected defence works at two points therein.

On the other hand, following the withdrawl of the Northern troops from Tsinan on April 30, the Southern troops began to arrive on May 1 in large numbers. By May 2 the number of the Chinese troops in the Foreign Quarter and within the Walled City had exceeded 70,000.

General Chiang Kai-shek, Commander-in-Chief of the Southern Army, who arrived on May 2, proposed to the Japanese Commander that, as the Southern Army would by all means ensure the maintenance of peace and order, the Japanese troops might speedily withdraw, and the above-mentioned defence works be removed. Accordingly, the defence works were removed on the night of May 2, and some of the Japanese residents who had gone to places of safety returned to their homes.

(*b*) On May 3, at 9.30 a.m., the house of a Japanese by the name of Chohei Yoshifusa, was looted by regular soldiers belonging to the Southern Army. About 30 Japanese soldiers commanded by a lieutenant hastened to the scene. The plundering Chinese soldiers had fled to the neighboring Chinese barracks. From these barracks they fired on the Japanese soldiers, some of whom were wounded. The Japanese then responded to the fire.

On the outbreak of this collision, the Southern troops, with which Tsinan was crowded at the time, almost simultaneously began, at various points, to fire on the Japanese troops, to massacre the Japanese residents and to plunder Japanese houses.

(*c*) The Japanese troops endeavored to afford shelter and protection to the Japanese residents, and also to drive the Southern troops out of the Foreign Quarter or to disarm them.

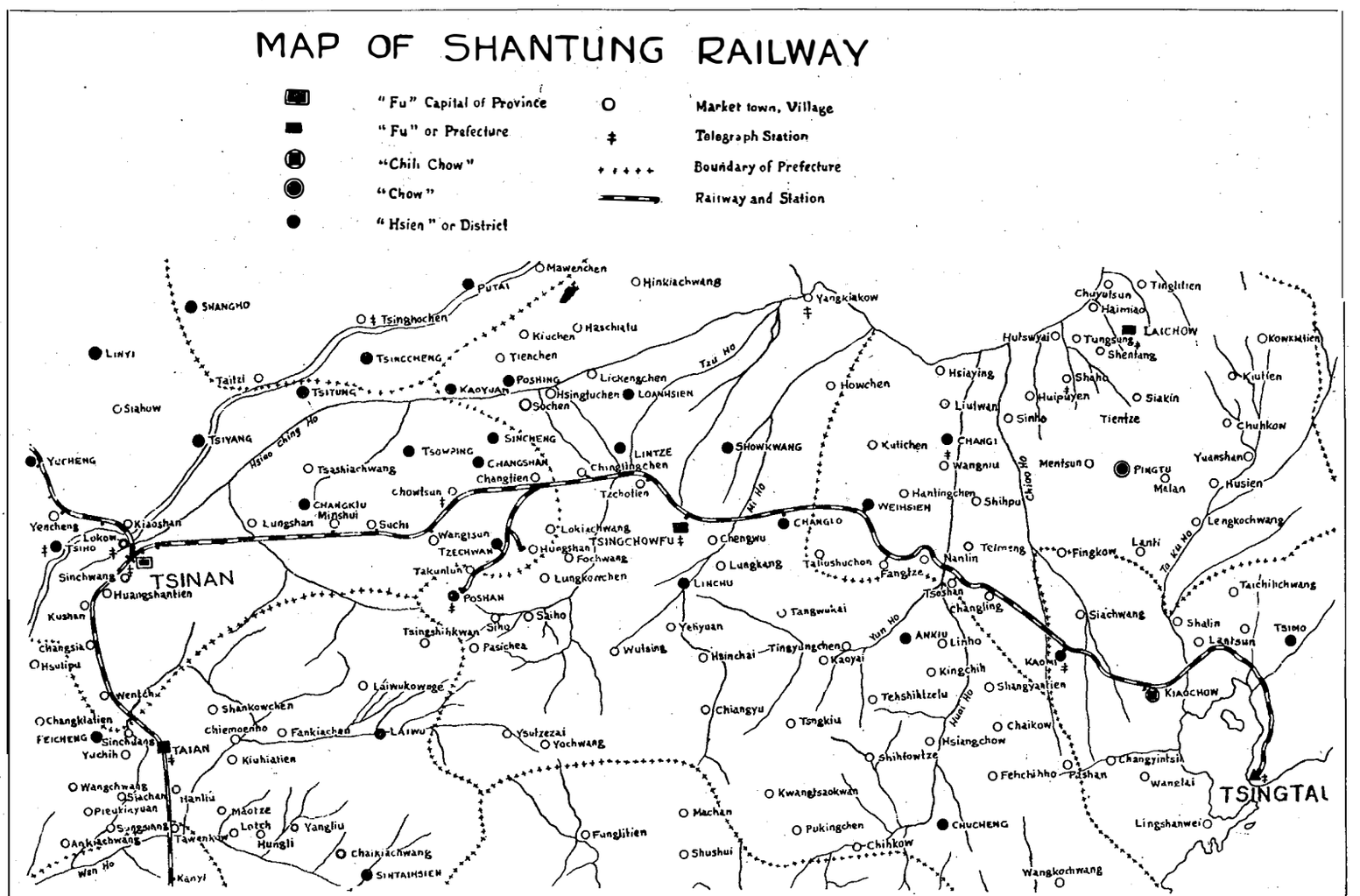
In the face of much danger the Japanese Consul contrived on several occasions to get into touch with the Chinese, and endeavored to bring about the suspension of hostilities. As, however, the Chinese troops continued firing, probably because the orders of General Chiang Kai-shek to the contrary were not obeyed, hostilities were not discontinued until the afternoon of the fifth.

(*d*) At that time, 4,000 Chinese troops still remained within the Walled City of Tsinan, while the number of those in the neighborhood ran into tens of thousands. They dug trenches round the Foreign Quarter. On the neighboring hills guns were in process of being placed in position, directed on Tsinan.

If hostilities had been permitted to be opened by the Chinese in such circumstances the Japanese troops and residents would have been placed in extreme jeopardy. It was, therefore, absolutely necessary for the Japanese troops charged with the protection of the Japanese residents to force the armed Chinese troops to leave Tsinan and the Shantung Railway without delay. On the 7th, at 4 p.m., the Chief Staff Officer of the Japanese troops demanded that the Chinese troops should withdraw to a limit of 20 Chinese miles (*i.e.* about 7 English miles) from Tsinan and from either side of the Shantung Railway. He also demanded the disarming of the Chinese troops who had committed outrages on the Japanese troops and residents, and the punishment of the responsible officers. A reply was to be given within 12 hours.

Not only did the Chinese fail to comply with the demand, but their troops assumed a even more threatening attitude. On the 8th, the Japanese troops set about clearing the locality. By the 9th they had driven the Chinese troops around Tsinan to points outside the approximate limit of 20 Chinese miles.

(*e*) On the other hand, the Chinese troops within the Walled City of Tsinan, including "un-uniformed soldiers," kept firing on the Japanese troops and on the Shantung Railway trains. On the afternoon of the 8th the Japanese troops endeavored to disarm them by pacific means, but they would not be persuaded.



In consequence, early in the morning of the 9th, the Japanese troops bombarded the points d'appui of the Chinese troops, such as the offices, within the Walled City, of the Tuchun (Military Governor of the Province) and of the Taoyin (District Governor) and the Walls, and at the same time took all possible means to induce the Chinese troops to get away and escape. As a result, early in the morning of the 11th, the greater number of the Chinese troops changed into plain clothes and escaped from within the Walls. Thus, except for the "un-uniformed soldiers" in ambush, the Chinese troops were driven outside the 20 Chinese mile limit.

(*f*) According to particulars ascertained up to May 15, fourteen of the Japanese residents were killed by Chinese troops in the present disturbance. Most of their bodies (including those of women) bore marks of having been subjected to inconceivably brutal acts of the most revolting character. Fifteen others were wounded. Various men and women were subjected to indescribable insults before the public gaze. The number of the Japanese houses looted is 131.

(*g*) With regard to the story of the alleged murder of Mr. Tsai Kung-shih, "Shantung Commissioner for Foreign Affairs," and of the members of his staff, which is bruited abroad by the Chinese, it may be remarked that, on the outbreak of the disturbance on May 3, the Chinese troops and "un-uniformed soldiers" fired indiscriminately at the Japanese, whether soldiers or civilians, from within all and any buildings where they could find a foothold. In fact, their fire from the Commissioner's Office (which was not known to be such by the Japanese troops engaged in fighting in that quarter) killed two Japanese soldiers. In the evening of the same day, part of the Japanese troops went on patrol. Over a dozen Chinese, who were lurking inside the Commissioner's Office, suddenly opened fire on these Japanese soldiers, who could not but respond to the fire and overpower them. Whether these included Mr. Tsai is not known.

It need scarcely be stated, however, that the Japanese troops would never in any case kill a single non-resisting Chinese citizen. Still less need it be said that the allegation regarding the "cutting off of nose and ears" is simply impossible, from the very nature of the character and habits of the Japanese people.

6.—The following points call for special attention in a survey of the circumstances attending the Tsinan Incident:

(*a*) The unfortunate incident owes its origin to the fact that Southern soldiers looted the house of a Japanese resident, and that they fired on the Japanese soldiers who went to the rescue.

(*b*) Before the incident occurred, the responsible officers of the Southern Army repeatedly declared that they would assume the responsibility for the maintenance of peace and order, and demanded the removal of the Japanese defence works. The Japanese troops removed their defence works on the night which, it so happened, preceded the outbreak of the disturbance, and some of the Japanese residents, who had gone to places of safety, returned home.

(*c*) The incident occurred immediately after the Japanese defence works were removed. At the moment that happened the Chinese troops, in various places, simultaneously began to attack the Japanese troops and to outrage and plunder the Japanese residents. This outrage and plunder were almost entirely confined to the Japanese.

These circumstances produced the impression that the disturbance was designedly brought about by the Chinese, at least by the lower classes among them.

(*d*) In the face of much difficulty the Japanese repeatedly established contact with the Chinese and arranged for the suspension of hostilities. On each occasion, orders failed to be obeyed on the Chinese side, and hostilities had necessarily to be continued.

(*e*) As the Chinese troops, including "un-uniformed soldiers," fired indiscriminately under cover of any houses they could find, the Japanese troops had to engage in street fighting in the most difficult circumstances.

(*f*) The brutalities which the Chinese soldiers committed on some of the resident Japanese men and women immediately after the incident occurred are so cruel that description of them is impossible.

(*g*) It is alleged that the limit of twelve hours attached to the demand which was made by the Japanese Commander on the 7th gave the Southern Army scarcely any time for consideration. It must be noted, however, that at that moment the circumstances were so urgent that the Japanese Commander was convinced that, if there were any delay, sharp practice on the part of the Southern troops would find its opportunity and place not only the Japanese residents but the Japanese troops themselves in the most dangerous position. His precaution was but natural in view of the faithlessness hitherto manifested on the Chinese side.

The Economic Salvation of China

By Y. F. Tseng, M. Sc.

[The following article, by a Chinese, is of such timely interest and presents such an original point of view, that we feel that it will be of advantage to our readers to publish it.—Ed.]

IN the following, endeavor is made to trace the cause of present chaotic condition of this country and find out ways and means for fundamental solution of our various political, social and economical problems. It is hoped that the writer's endeavor will form a basis of series of discussion and research to discover a practical plan for salvation of our country.

It is the writer's belief that our salvation lies fundamentally on economic reconstruction which in turn can only be carried out by completion of communication system, enlightenment of the mass and doing away with the disloyal inclination of mental and manual workers, no matter what will happen to the revolution and the unequal treaties.

Section I.—A Historical Research.

This research covers a period of 2,335 years from the later part of the feudalism (Chan Kuo) to the end of Ching Dynasty. The reigns of the Ching, Han, Sui, Tang, Sung, Yuan, Ming and Ching Dynasties covering 1,385 years, could be considered as united and peaceful although during this period there were not without internal discord and rebellions. During the Chan Kuo, San Kuo, Liangtsin, Nan-pei Chao and Wutai the country was divided into several feudal states by feudal lords periodically warring against one another, though fighting during these periods were not so serious as were in the Dynastic changes. Such feudalistic state lasted 771 years. Internal wars in consequence of dynastic changes lasted a total of 179 years. Following is a table showing result of such a research:

Table Showing Periods of Chaos and Peace During the 2,335 Years from Chankuo to the Close of the Ching Dynasty.

Name of Dynasty	Unification (peaceful) No. of Years	Separation (halfchaotic) No. of Years	Chaotic No. of Years	Main cause	Remarks
Chankuo	—	204	—	Feudalistic lords	Internal fighting among feudal lords.
Chin	12	—	—	—	Peace maintained by military force.
Last days of Chin	—	—	7	Common-people	At first rampancy of bandits, later fighting between Chu and Han
Eastern and Western Han	385	—	—	—	Chihmei (.. ..) and Wang Mang conspiracies
Last day of Han	—	—	36	Common-people and usurper	The Huangchin rebellion and the Tung Cho conspiracy.
San Kuo or Three Kingdoms	—	45	—	Usurper	—
Tsin	—	155	—	—	Though nominally unified but unification lasted not long, marked by distraction

Long Distance Telephone in Kwangsi.—To facilitate communication in Kwangsi province, the Department of Construction has appointed Chen Chieh to supervise the installation of a long distance telephone connecting Kweilin, Pinglo, Liuchow, Wuchow, Lungchow, Hohsien and Chungshan.

Tram Company's New Line.—The Peking Tram Car Company's new line from Tiao Bridge outside Hsin Hwa Men, through Hsin Hwa Street to Hsi Chu Shih Kou will be commenced early next month. Rails and other materials have been provided. The fourth line will now start from Chan Kiao, passing Tai Pin Tsang and will connect with the first line.

Ujigawa Denki K.K. (Ujigawa Electric Power Co., Ltd.).—Supply of electric light and power in the Tsumori District, along the Hankai Railway Line, has been through the Shikitsu and Dotonbori Substations, but in view of increasing demand in the Dotonbori territory, the company is planning to construct a new substation at Tsumori. The capacity will be 9,000 k.v.a.; current to be reduced from 22,000 volts to 3,400 volts. A license is expected in the near future, at which time the construction will be started immediately.

Kawakita Denki Kigyo K.K. (Kawakita Electric Enterprise Co., Ltd.).—The company has decided to organize two new companies, one to be known as the Kawakita Denki Doboku K.K. (Kawakita Electric & Construction Co., Ltd.) to be capitalized at Y.2,000,000. The other Kawakita Denki Shoji K.K. (Kawakita Electric & Commercial Co., Ltd.) capitalized at Y. 1,000,000. The Kawakita Denki Kigyo will transfer the greater part of its business to the new concerns, retaining a controlling power and its activity as a promoter of electric enterprises.

The new Kawakita Denki Doboku will engage in all work in connection with construction in the electric light and power field such as building, foundation, dam, power station and substation contracting and in general civil engineering contracting. The Kawakita Denki Shoji will manufacture and sell telephone equipment and electric machinery.

Three New N. Y. K. Liners Named.—The three new motor driven Trans-Pacific liners which are now being built for Nippon Yusen Kaisha have been named after Japanese shrines, following the usual N.Y.K. Custom. The two being constructed at Nagasaki for launching early spring in 1929 will be called the Asama Maru and the Tatsuta Maru while the one being built at Yokohama for service in 1930 will be called the Chichibu Maru. The latter named after H. I. H. Prince Chichibu.

These three vessels, when completed, will be unsurpassed for luxurious travel from San Francisco to Japan and China. Everything that has been contrived for greater marine efficiency and comfort, together with many entirely new and important features, will be incorporated. The Diesel oil burning engines will add to the cleanliness aboard ship, reduce vibration and materially shorten the length of time for the passage.

These ships will be of 23,000 tons, 20,000 H.P., 19 knots Speed and will make the run from the Pacific Coast to Japan in 15 days.

Chinese Tin Production.—There is a report in the City that operations on some of the tin mines in Malaya that are owned and worked by Chinese have already been suspended on account of the drop in the price of the metal, which is now about £230 per ton, against £266 at the beginning of the year.

Questioned on the subject a London metal authority said to a "Daily Mail" reporter:

The present price of tin is sufficiently low to make it doubtful whether the Chinese-worked mines that still employ primitive methods can still be run to pay, but I have no definite information yet that any material closing down has taken place.

It has been noticed in the past, we are informed, that a drop in the price of the metal has been followed by an increase in the output of some Chinese-worked properties, the men on these mines having presumably had to work harder than before to earn their keep; but a comparatively low price for the metal for a prolonged period would probably result in a gradual suspension of operations on these properties.

Junction Line for Taonan-Angangki and Tsitsihar-Angangki Railroads.—In order to arrange for the early completion of the junction of the Taonan-Angangki and Tsitsihar-Angangki railways, the Ministry of Communications has appointed Yu Chen-fu to negotiate with the management of the Chinese Eastern Railway as the junction line will have to cross the C.E.R. In spite of the objection raised by the Russian directors of the Chinese Eastern Railway, it is learned that construction will be started immediately. Although the distance between the two railways at their terminal is only nine *li*, the work will be quite extensive as the 45 mile Tsitsihar-Angangki line will have to be widened; its present gauge being used formerly for a light railway. Upon the completion of this junction line, beans and other important foodstuffs will be easily transported to South Manchuria, thus increasing traffic on all railroads and benefiting the people.

Kiangsi-Fukien Highway.—Transportation in Kiangsi province has always been bad. Last year, plans for the construction of five trunk roads were completed, but owing to civil war, they have not been carried out, excepting 30 *li* of the road between Nanchang and Lientang. The Department of Construction has bought 20 automobiles from Shanghai to run on it. For the construction of the Kiangsi-Fukien highway the Department of Roads has made a contract with the China International Famine Relief Commission, some of the important terms of which are as follows:

1. The chief engineer of the Kiangsi branch of the China International Famine Relief Commission has the right to revise the plans drawn up by the Department of Roads.
2. The C.I.F.R.C. contributes $200 for the construction of each *li* and the Department of Roads is responsible for any deficit. The construction of bridges and canals is to be paid for by the commission.
3. The C.I.F.R.C. furnishes surveyors and surveying instruments. The Department of Roads is to furnish laborers, the numbers of which and the places where they shall work, to be designated by the Commission.
4. The staff of the C.I.F.R.C. claims protection from the authorities in all *hsiens*.
5. This contract becomes effective from the date of signature and holds good for succeeding civil authorities in Kiangsi until the completion of the road, the administration of which will be duly handed over to the provincial government.

Mining in Indo-China.—Discussing the future of mining in Indo-China, a Tonkin correspondent of "L'Echo des Mines" deprecates the tone of disillusionment adopted recently in the expression of views on the situation of the industry in the region indicated. In the first place, there can be no doubt that the future of the Tonkin coal industry is assured, and that the output can be substantially increased without risk of over-production, provided the commercial side proves equal to its task. With regard to tin, the value of the current production is nearly 20,000,000 frs. per annum. For most of it the Tonkin mines are, no doubt, responsible, but, on the other hand, a large production is as yet scarcely to be expected of the mines in Laos, most of which have been started only recently, and are engaged in getting their plant and equipment set up, under transport conditions of which outsiders can form no adequate idea. It should, the writer says, be made known that Indo-China is, naturally, a mining country par excellence. From a geological point of view—apart from the recent great deltas—the whole of Indo-China is a very ancient country, which has emerged since the beginning of the Secondary, and is analogous on many sides to the great French central "massif." Moreover, its soil has been the theater of orogenic phenomena dating from the end of the Primary or the beginning of the Secondary, these characteristics being recognized, save in particular cases, as favorable to the existence of metalliferous deposits. Contrary, perhaps, to general belief, these conditions are present not only in the case of Tonkin, which is beginning to be well prospected, but also in the case of Annam, Cambodia, and part of Laos, where miners have scarcely penetrated. Mining in Indo-China may, accordingly, be regarded with absolute confidence in its future and the writer predicts that a few decades hence there will be general astonishment at the rather timid prudence shown in developing the mineral wealth which the country undoubtedly possesses in great abundance.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

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遠東時報

THE REBUILDING OF CHINA'S FINANCES

THE RUSSIANS LEAVE CHINA

By GEORGE E. SOKOLSKY

CHINESE COLONIZATION OF MANCHURIA

By C. WALTER YOUNG

A CONDITION, NOT A THEORY

By Dr. C. J. FOX

Vol. XXIV July, 1928 No. 7

SHANGHAI, PEKING, TOKYO AND MANILA

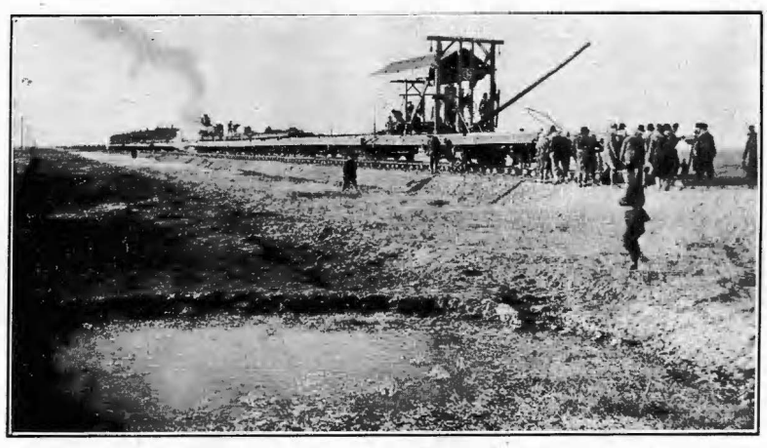
Chinese Colonization in Manchuria

Part II.—Settlement Zones and Economic Effects

(Continued from June).

By C. Walter Young

Aside from the question of the actual totals of Chinese immigrants who during the past few years have migrated to Manchuria no subject seems to have given rise to more diversity of opinion regarding this movement than that of the localities to which these colonists have gone. To what zones of settlement, for example, did the million immigrants who entered Manchuria in 1927 proceed, and what factors determined their course? Naturally confusion has arisen out of the extreme difficulty of obtaining accurate data at the points of dispersion which usually are the stations on one or the other of the railways from which these settlers have spread in living fans, often fans opened to form complete circles of settlement. Moreover, what might be termed the *economic magnetism* of each of these areas of colonization is of much importance alike to the settlers, the railways in Manchuria and the scientific organizations in China and abroad who recently have begun to study settlement in Manchuria. The million Chinese immigrants who came in 1927 and the possible two million or more who will have come in 1928 will mean much to the future development of Manchuria. Essential to appraisal of these effects are the economic characteristics of the areas of settlement in Manchuria which, in the interest of clarity, have been delimited into specific zones, nine in number, and in each of which something of the history of settlement is considered.



Track Laying on the South Manchuria Railway

Distribution of Immigrants in North and South Manchuria

It is generally agreed that the majority of the Chinese immigrants who enter Manchuria proceed to "North Manchuria," the exact percentage of the total varying with the inclusiveness of the term "North Manchuria." If by that term we mean to include that territory which lies generally north of Changchun, the junction point of the South Manchuria Railway and the southern branch of the Chinese Eastern Railway, and which comprises the whole of Heilungkiang province as well as that part of Kirin served by the eastern section of the Chinese Eastern between Harbin and Pogranitchnaya, then over *two-thirds* of all the immigrants who entered Manchuria in 1927 proceeded to North Manchuria. Moreover, although the division of Manchuria into a *North* and a *South*, though referred to generally in certain treaties, has no definite political status, and far less an international legal status, for the purposes of the study of immigration and settlement Changchun is a convenient division point and all territories served by the Chinese Eastern Railway may well be considered as parts of North Manchuria. Progressive settlement of North Manchuria as well as the trend of political events not necessarily related thereto may in the not far distant future efface the present significance of this division and make Harbin, rather than Changchun, a city which will mark the division of the north and the south. The importance of accurately denoting "North" and "South" Manchuria is evident in the fact that in arriving at the conclusions that 53 per cent. of the immigrants proceeded to "*North Manchuria* in 1927," the Research Office of the South Manchuria Railway excluded the area from Changchun north to Harbin from "North Manchuria."

Relative Importance of North and South Manchuria.—Out of an estimated total of 630,000 immigrants who entered Manchuria during the first six months of 1927, approximately 430,000 continued into North Manchuria, or 68 per cent. North Manchuria is far more important as a potential settlement area than South Manchuria, and though in the past its settlement has been hindered by a combination of factors, principally its distance from Shantung

Scene of a Wood-Cutting Place Near the Upper Stream of the Yalu River

City Gate of Kirin, Manchuria

Arriving at the 9th Station: Kirin-Changchun Railway

and difficulty of access due to inadequate communication, it has now assumed the place, predicted twenty years ago, of first importance in its attraction for settlers. By and large North Manchuria has greater agricultural potentiality, the density of its population is still far below that of Fengtien province, its cultivable area is much larger and judged by present production that portion of North Manchuria which is served by the Chinese Eastern Railway already is the principal cereal producing region of the whole of Manchuria.

In South Manchuria, on the other hand, while its railway communications are superior, there is less of natural soil fertility, especially poor being much of the Liaotung peninsula not in the immediate vicinity of the Liao river, and though there are very fertile areas in Kirin province which now are being rapidly taken up by the new settlers, this region is rather of greater present than future importance when compared with North Manchuria. Moreover, there are parts of Fengtien province in which the density of population is already such as to make further absorption of immigrants impossible. In fact, from such places as the Liaoyang district, south of Mukden, there is a constant movement of Chinese to broader fields and more fertile in that less developed country north of Changchun.

Settlement Zones in Manchuria.—Manchuria as a whole, treated as one great *pioneer belt*, for purposes of convenient study may be divided into no less than nine separate *settlement zones*. Obviously no rigid lines of demarkation can be drawn to separate these nine zones for they are not uniform in size or shape and they tend often to fuse one in the other. Some, to be sure, are quite distinct, such as that of the Yalu river area. Yet they all remain in a manner distinct, each having its own characteristics of settlement principal among which are (1) the means of access by rail or water, (2) the economic geography of the area, (3) population characteristics, (4) and the stage of development and relation to markets, which make this classification by no means as arbitrary as at first might appear to be the case. These zones, nine in number, have been determined principally by two factors, the means of access and the *economic magnetism* of each zone. For convenience they will be referred to by the titles given them in this classification, which gives in addition the approximate distribution of immigrants in each of them for the first half of 1927 : *

SETTLEMENT ZONES IN MANCHURIA (SHOWING DISTRIBUTION OF IMMIGRANTS IN 1927).

	SOUTH MANCHURIA (32%).	
I.	The Yalu River Zone	25,000
II.	Upper Sungari River Zone	100,000
	Miscellaneous (spreading from the above and along other railways, such as, the Peking-Mukden, South Manchuria, Ssupingkai-Taonan, etc.)	75,000
	Total	200,000
	NORTH MANCHURIA (68%).	
III.	The Taonan Zone	15,000
IV.	Upper Nonni River Zone	35,000
V.	Changchun Northern Zone	35,000
VI.	Western Zone of the Chinese Eastern Railway..	60,000
VII.	Eastern Zone of the Chinese Eastern Railway ..	125,000
VIII.	Hulan River Zone	10,000
IX.	Lower Sungari River Zone	150,000
	Total	430,000

I.—The Yalu River Zone

Of the two settlement zones in South Manchuria which are of present importance that of the Yalu river was the first to be settled by Chinese in modern times. A distinct characteristic of this region is that it still presents the fact of a very large return migration each autumn and winter to Shantung. Many of the immigrants still might the better be classified as seasonal laborers.

Of ready access by junks from Shantung it has grown in importance from its early character of illicit search for ginseng, the herb so highly valued even to the present in Chinese indigenous medicine, of discovery of gold in the upper reaches of the river, of agricultural settlement about Antung, near the mouth of the Yalu, with the interesting history of production of *tussah silk*, first in filatures in Shantung to which the wild silk-worm cocoons were sent, and then in filatures in Antung with Chinese operatives from Shantung, until to-day the principal cause of the immigration may be found in the timber reserves in the headwater areas of the Yalu and of the Hun river. Manchuria is the most important forest area of China, and the Yalu zone, though by no means the greatest, is yet one of significance which has for its principal appeal for the immigrants to-day the necessity for raftsmen on the river to pilot lumber rafts, these picturesque floating palaces of China, down the river in their excursions of two months from the Long White Mountains to the sea.

In the Yalu zone, characteristic of Manchuria until three years ago, immigration from Shantung was principally seasonal, employment in rafting and timber felling, naturally being seasonal occupations. With the breaking of the ice on the river in early spring the tide of immigration began from Shantung about the first of April, varying with the season. Conditions in Shantung, however, have operated to alter this regularity, as in 1911 when one of the Shantung famines drove tens of thousands of Chinese out of the inundated areas to the Yalu zone, thousands arriving in mid-winter.†

The Yalu Timber Company, a joint Sino-Japanese enterprise founded in 1908 with a capital of $3,000,000, has the exclusive lumbering rights on the right bank, the Manchurian side, of the upper reaches of the river. There are, however, at present several private Chinese firms operating at various places in the vicinity.

* These figures bearing on the distribution of settlers in Manchuria have been compiled principally from materials published by or otherwise obtained from the two organizations who have preserved statistics of the movement, that is, the South Manchuria Railway Company and the Chinese Eastern Railway Company. Those of the former were prepared by the Research Department, under the direction of Mr. K. Futamura, chief of the Labor Bureau of the Company. The most recent and comprehensive of three studies published by the Research Department, all in Japanese, is "Manchurian Settlers in 1927," 176 pages; Research Publication No. 70, November 20, 1927 (Dairen, S. Manchuria). Reports of the Railway Department and of the Economic Bureau of the Chinese Eastern Railway (Harbin) have been drawn upon, as well as private memoranda submitted by their staff experts. Unfortunately the writer has not had access as yet to a valuable work in Russian recently published and now in process of translation into Chinese by the Chinese Eastern Railway.

† *The Manchuria Daily News*, November 8, 1911.

Firewood Boats in the Sungari

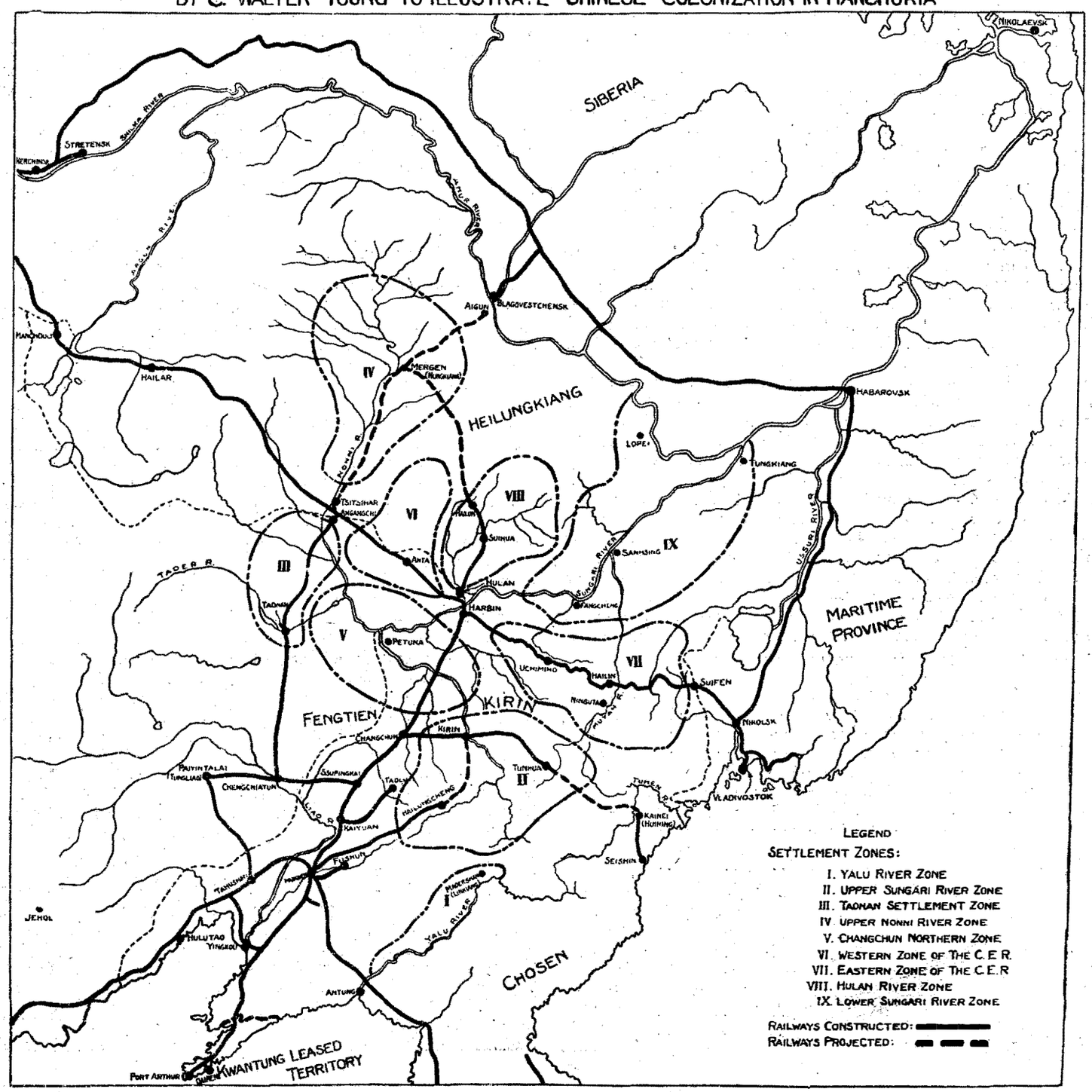
For the past several years groups of Chinese immigrants and laborers have begun to arrive in early spring by steamer and junk principally from Lungkou, Chefoo and Tsingtao, the three ports from which most of the immigrants entering Manchuria have come. In 1926 practically all the raftsmen on the Yalu were Chinese. During the first six months of 1927 approximately 23,000 Chinese came from Shantung to Antung to be employed seasonally or to remain as permanent settlers. A small number enter the Yalu zone from the north after they have proceeded inland by way of the South Manchuria Railway and the interior lines to the heart of Kirin province from which they have treked to the south in the Chientao district, now well settled by Koreans. The Yalu zone of settlement, the most southern to be characterized, is one of the least important potentially. Although the region immediately about Antung is agricultural in character, producing Manchurian staple products and in addition the cocoons from which pongee silk is made, the worms feeding on the wild oak trees of the district, its agricultural future is not of great importance when compared with the vast virgin lands which lie to the north. Moreover its contiguity to the Chosen border limits its attractiveness for the Chinese.

II.—The Upper Sungari River Zone

The most important settlement zone in South Manchuria is that of the upper Sungari river. This comprises the territory which falls principally within Kirin province, including Kirin city and lying generally east of Changchun. As thus characterized the Upper Sungari River Zone includes an area across the headlands of the Sungari in the Long White Mountains and the valleys adjacent to the river stretching from near the Chosen border on the south to include the headwaters of the Mutan river (the Hurka) to the northeast.

That this zone of settlement is of present importance is indicated by the fact that approximately one hundred thousand Chinese entered the zone of the upper Sungari during the first six months of 1927. For the past five years it is this zone which has seen the most noteworthy development of all in Manchuria. It

OUTLINE MAP SHOWING SETTLEMENT ZONES IN MANCHURIA. ORIGINALLY PREPARED BY C. WALTER YOUNG TO ILLUSTRATE "CHINESE COLONIZATION IN MANCHURIA"



lies in the cereal and bean belt of South Manchuria which has been widened to the east with the development of the country through the progressive advance of the railways. This zone and that to the west towards Mongolia show most clearly the direct result of the construction of new railways upon the direction of immigrant settlement.

The *economic magnetism* of the upper Sungari area, which includes some of the richest agricultural lands and forest areas in Manchuria, lies in the fact that much of the country yet remains to be developed, that most of the area offers inducements by way of readily available lands for settlement and that there is an excellent market by virtue of the service of four railways which tap the zone, the Changchun-Kirin line, the Kirin-Tunhua line, the Mukden-Hailungcheng-Kirin line, and the lesser important Kaiyuan-Taolu light railway. In this zone there is more railway construction now under way than anywhere else in Manchuria. The construction of a through communication from Tunhua with the Korean (Chosen) border would open much virgin country and furnish a new produce outlet through Chosen and the Japan Sea, a route which would be of great value to Japan as a direct approach to the cereal produce, especially the rice of Kirin province.

Some idea of the forest wealth of the southeast portion of the upper Sungari country may be had from a conservative estimate made by a recognized lumber expert, Mr. Waldemar Toritch, of Harbin, who places possible production at six billion board feet. *Generally it may be said that most of the lower slopes of the Chang Pai Shan from the Chosen border to the Chinese Eastern Railway, as well as the slopes of the Hsiao Pai Shan, are still heavily wooded, progressively denser as one proceeds interior from the river banks. Japanese and Russian authorities agree that, although no accurate figures of potential production for the whole area can yet be given. it is this forest area which has the greatest commercial importance for the immediate future. The stand is generally good, the varieties, both of pine and deciduous trees, several, and the nearness to market, particularly by virtue of the facilities for outlet yet to be exploited on the Tumen river, will serve to encourage development in the immediate future. But although in this timber development there will be some demand for immigrant laborers it is rather the reaction of the industrial growth of the country which produces trade marts that leads indirectly to attracting immigrants. Such has already been the case between Kirin and Tunhua on the recently constructed railway.

The mineral resources of Kirin province have never been adequately studied. They are known to include, however, in addition to the gold and copper now being mined in the T'ien Pao Shan district contiguous to the proposed Huining (*Kainei* in Japanese) terminus of the Kirin-Tunhua-Huining railway, also aluminum in the valley of the Mutan, north of Tunhua.† These and several chemical minerals are of some importance though far less than the coal and iron at Fushun, Penhsihu and Anshan which are widely known abroad. That mining has attracted many immigrants in the recent past to this settlement zone, these mostly for a temporary residence to be sure, is evidenced, for example, by the fact that from 1918 to 1920 inclusive approximately 60,000 miners or mine laborers were actually recruited in Shantung and Chihli for employment at the Fushun Colliery. Since then the number recruited has fallen off rapidly as the period of expansion has passed and now it is unnecessary to recruit laborers, so many are they who are flooding into Manchuria. The mines do continue to employ annually and permanently large numbers of these immigrants from Shantung.

Agriculture and Permanent Settlement in the Upper Sungari Zone.—Historically both the timber and minerals have been of influence in attracting settlers to the Upper Sungari Zone, but the factor of greatest influence in attracting permanent settlers is the opportunity for agricultural pursuits. Even before the country was tapped by the building of the Changchun-Kirin Railway by the Chinese the region about Kirin was an attraction for agricultural settlers and an even larger number of summer farm laborers from Shantung. The building of the railway, however, led to rapid development, a growth which has been increased by the building of three other lines into the area. The recent opening of hitherto idle country in the interior from the Kirin-Tunhua line, opened to traffic in 1927, has already resulted in the establishment of railway trade marts on the route and during the year past a steady stream of obviously permanent settlers has poured into the country beyond Kirin.

Approximately 100,000 Chinese immigrants entered the Upper Sungari Zone in the first half of 1927, perhaps at least half that number more by the end of the year. Of these over half were carried by the Mukden-Hailungcheng (Fêng-Hai) and the Kaiyuan-Taolu (Kai-Tao) lines, the remainder being transported over the Changchun-Kirin (Chang-Chi) railway and thence in part on over the Kirin-Tunhua (Chi-Tun) line. The distribution of settlers is general from Changchun east beyond Kirin. On the west Hsianhsien, Tungfenghsien and Hsifenghsien have absorbed a great many, and some have moved inland even as far to the southeast as the Chientao district near the Chosen border.

Throughout this zone the standard Manchurian crops, kaoliang, millet, some wheat and much soya beans after the first year, are grown, with the addition of rice. Rice is becoming of increasing importance in Kirin province and is now grown from the Chosen border, practically throughout the province, as far north even as the Amur river and beyond Manchuria in the Siberian littorals. Introduced and still mostly produced by Korean farmers in Manchuria, many of whom incidentally are moving farther and farther north into Heilungkiang province, rice is now interesting the Chinese farmers who have learned from the Koreans both the method of cultivation and the attractiveness of the market. This is an interesting development in Manchurian agriculture and of much importance to Japan, the principal purchaser of the export.

As for the rest of South Manchuria there is nowhere sufficient concentration of settlement to form a zone worthy of special comment. The number who settle along the Peking-Mukden railway is very small, in spite of the fact that that line carried some 200,000 immigrants to Mukden during the first six months of 1927. Of those not included within the settlement in the two zones characterized as the only ones of importance in South Manchuria the majority seem to spread out from Mukden, some settling in the immediate vicinity, but perhaps the greater portion eventually finding their way to the Upper Sungari Zone. Mukden is situated in a territory already well populated which can offer no permanent inducements to settlers.

North Manchuria as a Pioneer Zone

North Manchuria, which includes practically all of Manchuria lying north of the forty-fourth parallel of latitude, is the pioneer zone *par excellence* of the Three Eastern Provinces. In size it is larger than pre-war Germany; in development it represents the economics of the frontier, not unlike the Mississippi valley of the opening years of the nineteenth century. Except for the industries developed here and there along the main line of the Chinese Eastern Railway, especially concentrated in the northern metropolis of Manchuria, the trade mart of Harbin, this wide expanse of country of varying topography remains to-day largely undeveloped.

In spite of the fact that this part of Manchuria has only seen the actual cultivation of but one half of the arable lands it includes, it has already become the principal grain producing region of the Three Eastern Provinces. Its population has increased at least ten times in the last thirty-five years and still, it appears from recent researches conducted by the Economic Bureau of the Chinese Eastern Railway, in 1926 the total population of North Manchuria was probably less than 13,000,000. The Bureau has estimated that only 15 per cent. of the entire land area of North Manchuria is now under cultivation, and that an area at least equal to this amount is fit for colonization by agricultural settlers. In Kirin province only 18 per cent. of the land area is estimated to be under cultivation; in Heilungkiang province, but a little over 8 per cent. The former can be doubled, the latter quadrupled, for such is the estimated extent of the arable area.

Thus, while North Manchuria is the largest and least developed part of the country its potentialities are the greatest, especially in agriculture, and this in spite of the less favorable access to markets than in South Manchuria. From the predominantly agricultural

* The Agricultural Office of the S, M. R. has published detailed studies of forest reserves and potential production in Kirin province which give an excellent idea of the distribution of the timber lands and of the kinds and quantities of each. See "Agriculture in Manchuria and Mongolia," Monthly Supplements, October, December and February, 1927-1928, issued by *The Manchuria Daily News* (Dairen, S. Manchuria). See also "North Manchuria and the Chinese Eastern Railway," p.189 (published by the C. E. R., Harbin, 1924, 454 pages).

† See Dr. H. Murakami, "The Geology and Mineral Resources of South Manchuria," published by the Geological Institute of the South Manchuria Railway Company (Dairen, 1926). Dr. Murakami is chief geologist of the Railway Company.

character of the country—eighty to ninety per cent. of the population are farmers—it follows that as a settlement zone North Manchuria now is and in future is destined to be of major attraction for the Chinese immigrants from the south. Over 400,000 immigrants entered this northern part of Manchuria during the first half of 1927, all but a few of them passing through Harbin, which is the immigrant dispersion center of the north.

Agricultural and Settlement.—Agriculture has been the determiner of settlement zones in North Manchuria. Of the seven separate settlement zones three are entirely agricultural, the sole industry being the tilling of the soil, and in the other four it is farming which has attracted the new settlers. Thus in North Manchuria, as in other pioneer zones of the world, it is agriculture that has the most intimate relation of all the industries to settlement. The more so is this true where the colonists are themselves farmers as are those who come to Manchuria. These very zones of settlement are the principal plain lands of North Manchuria which lie between mountainous portions, the Great Khingans to the west, the Little Khingans paralleling the Amur in the north, and the continuation of the Chang Pai Shan ranges in the east, forming a huge pocket of generally cultivable land from the valley of the Nonni in the west, across the exceptionally fertile Hulan valley, to the Sungari watershed where between low ranges of mountains the valleys and the rolling foothills are available for the plough.

Most of these mountainous areas are heavily wooded though, partly from lack of facility for transporting the timber to markets, partly from the fact that the timber in the immediate vicinity of the Chinese Eastern Railway has up to now been sufficient for local consumption, they have not been exploited to any great extent even though it is estimated that no less than forty per cent. of the entire land area of North Manchuria is covered with forests. Next to agriculture, forestry is, however, the principal industry, or, perhaps it might more accurately be termed, timber cutting. The presence of these forests does suggest that in future their wealth will attract a larger population to the country, but up to the present timbering has played but a small part in permanent settlement.

The presence of the mountains also suggest mining, though here again that industry has been of little importance in attracting permanent settlers. Except for the recent exploitation of certain rich coal mines near Lake Hanka, north of Pogranitchnaya, by Russians and Chinese, certain others in the valley of the Nonni to the west, and especially the Chalainor coal fields, the mineral resources of North Manchuria have not been developed. The gold washing in the tributaries of the Amur in the extreme northern part of Heilungkiang, and in a few other places, has been haphazard and largely conducted without much capital. The "gold rush" days in Manchuria are long since past and what remains of the yellow earth awaits both capital and a change in the restrictive and practically prohibitive Chinese mining laws of North Manchuria. But the presence of minerals, not alone coal and gold, suggests as does the presence of the forests, a future which will inevitably have bearing on settlement. Particularly do the coal mines give hope for immediate development and within the past two years North Manchurian coal has begun to supply Harbin, which recently obtained 90 per cent. of its coal supply from the Japanese colliery at Fushun.

III.—The Taonan Settlement Zone

Taonanfu, the prefectural city which marks the southern edge of the Taonan Settlement Zone, is situated on the Taoer river, a tributary of the Nonni. Taonan (properly T'aonan the principal town of the district of present settlement which includes also T'ailai, the most important town on the newly constructed Taonan-Angangchi line between the two termini, and T'aoan lying to the north and more or less in the center of the best agricultural lands of this zone. This territory is under the administration of the civil governor of Mukden nominally, though in actual control of a local military commander allied to the Manchurian military régime. The local *taoyin* nominally is subordinate to the civil governor of Mukden. It seems essential to mention these facts as among geographers this twilight zone of administration between Manchuria and eastern Inner Mongolia is often considered as a part not of Manchuria but of Mongolia.

As a settlement zone the Taonan area has little present importance and its future is not encouraging. This is contrary to a very prevalent view which is partially the reason for the rather minute attention here given to the character of the district and of the land contiguous to the new railways which traverse this part of western Manchuria. Before 1925 very few immigrants entered this zone in spite of the fact that the Ssupingkai-Chengchiatun Railway and the Chengchiatun-Taonan Railway made through traffic possible after November, 1923. In 1925 only about 5,000 immigrants entered the Taonan settlement zone. In 1926, however, the number had trebled, while during the first half of 1927 approximately as many entered the zone as during the whole of North the previous year, a number estimated to be about 15,000. When compared with the hundreds of thousands of immigrants who entered other parts of Manchuria during the same period it is evident that these few do not make of the Taonan zone one of the principal places of absorption of immigrants, contrary to a somewhat general belief. It is further of interest to note that no more than 6,000 have settled south of Taonan in the territories served by these railways in the entire period since the opening of traffic through to Taonan in the autumn of 1923.

Partly to obtain the facts with reference to settlement in the territory traversed by these new railways in western Manchuria the writer traveled over the Taonan-Angangchi line, the Chengchiatun-Taonan line, and the Ssupingkai-Chengchitatun line during the summer of 1927. Inquiries made of local Chinese station masters from Angangchi to Taonan elicited the view that of the immigrants who were being carried by the railway a very large number of them continued north all the way to Angangchi, and from there on foot across the Chinese Eastern Railway to Tsitsihar, seventeen miles north of the main line of the Chinese Eastern. From Tsitsihar they disperse still farther north in the valley of the Nonni river. There is some settlement adjacent to the railway but it was not especially evident during the months of mid-summer. Such as there is, is in the Taonan area in the angle formed by the Taoer river and the Nonni.

The reason for this rather small absorption of immigrants in western Manchuria lies in the fact that the country, generally speaking, does not have much natural fertility. The soil quality adjacent to the railways all the way from Angangchi to Ssupingkai is very irregular. South of Angangchi it is sandy and there are traces of alkali areas. Nearer Taonan in the river valleys the soil improves, but here too it is streaked with the white knolls which appear rather to be drifted sand than alkali. The alkali is evident only in the lowlands and depressions between these knolls.

The whole territory from Angangchi to Chengchiatun is generally not under cultivation, grazing predominating with only limited areas which produce the usual Manchurian staples, principally kaoliang and soya beans. The year 1927, generally, produced a crop of kaoliang in Manchuria both tall and thick, but in this part of Manchuria it was very evident that the natural fertility of the soil was far inferior to the lands which lie to the east about Changchun or Petuna for the kaoliang was short and the stand poor. Only with plentiful rains and consistent is there assurance of much agricultural production in this area. The country, it would seem, except for localized areas about Taonan, is destined to remain much as it is for the time being, a grazing country which produces sheep, horses and cattle. These characteristics of the territory traversed by the new railways from Chengchiatun to the Chinese Eastern Railway account for the relatively few immigrants who have entered the Taonan settlement zone to remain permanently. In passing, it is well to draw attention to the fact that the railways which traverse the country have as their ultimate object the freights to be had from Mongolia or from the very rich areas which lie about Anta on the Chinese Eastern Railway, which latter traffic will in part be diverted over these lines when once the question of connections with the Chinese Eastern Railway at Tsitsiharchan is adjusted.

IV.—The Upper Nonni River Zone

The Upper Nonni River Settlement Zone, occupies the extreme northeastern section of the great Manchurian plain. Here the river flows south toward Tsitsihar and Petuna where it joins the Sungari, and above Tsitsihar the country it traverses is predominantly a plateau sloping to the south and intersected by the tributaries of the river. In these valleys are cultivable lands. On the whole, however, though Tsitsihar has long been a trade mart of importance as an outpost for supplying the frontier country of forests and fur-bearing animals in the Great Khingans and the headwaters of the Nonni, the general character of the soil may be characterized as

mediocre. Most of the land which is cultivable has never seen the plough. The tending of flocks of sheep and ranging horses—this is, indeed, one of the leading sources for the Manchurian ponies—is its principal occupation. Geographically and political the zone marks the transition between the great prairie country of Mongolia, the Barga district so-called, and the central Manchurian plain. Because for long it has been an outpost of Mongol influence this settlement zone of the Nonni above Tsitsihar has had much political significance. For the Russians it has been a stepping stone to Mongolia and a link with the Amur country.

As but of mediocre agricultural importance it has not attracted many settlers. No railway serves the region and the Nonni is not the best for navigation even when its frequent floods subside. There is, however, a long high road for carts from Tsitsihar north to Mergen (Nungchiang) roughly paralleling the river and from Tsitsihar there is, of course, the outlet on the Chinese Eastern Railway. Tsitsihar has become, however, a trading post of importance and is now the place of assembly for those of the immigrants who enter the Nonni Settlement Zone. It is the provincial capital of Tsitsihar and besides its connections with the frontier country to the north has local milling industries which supply native demands and produce export for the railway. But the zone now marks the terminus of the north and south railway system of western Manchuria, and Angangchi, near Tsitsihar across the Chinese Eastern, is the end of Taonan-Angangchi line recently finished. As such the upper Nonni area is the natural receiving station, as it were, for the immigrants who come both over the west Manchurian lines and by way of the western section of the Chinese Eastern Railway. Since no less than 35,000 immigrants were carried by the Chinese Eastern from Harbin to Tsitsihar station during 1927 it may be presumed that the greater part of them actually entered the Upper Nonni Settlement Zone. Below Tsitsihar and the east for a short distance the soil is very poor and offers no inducements to settlers. There is in addition a considerable movement of immigrants from the west Manchurian lines, those who have come through Taonan and Angangchi.

The future of this zone depends very much on whether or not the extension of the Taonan-Angangchi Railway, now planned to continue to Mergen, actually is built. If so it will offer a ready communication with those parts of the Nonni area which have attraction for settlers, more especially those areas which lie east of the river and blend into the very fertile valley of the Hulan river directly north of Harbin.

V.—The Changchun Northern Zone

The settlement zone which lies to the north and west of Changchun, the great distribution center for the Chinese immigrants who have come either by sea in part or entirely by land from Shantung and Chihli, is the first North Manchurian settlement area which lies on the main route of immigration. An oval drawn to include the principal places of present settlement within this zone from a point east of where the Sungari river is crossed by the southern branch of the Chinese Eastern Railway (Hsiaochengtzu), where this zone fuses with that of the Upper Sungari, would extend to a western point half way between the confluence of the Nonni and the Sungari and the Taonan-Angangchi Railway. This would be its longest diameter. The shorter would be the greater portion of the southern section of the Chinese Eastern Railway, thus showing the entire Changchun Northern Settlement Zone to include the town of Nungan, northwest of Changchun, and the angle formed by the Sungari river near Petuna (Potunei). To the south of the zone, especially about Changchun, is the great central Manchurian bean belt. This is the fertile prairie country which lies between the upper Liao river and the central Sungari sections, and stretch to the west to merge into the rolling prairies about Taonan.

The stage of agricultural development in this settlement zone is the farthest advanced of the six settlement zones in North Manchuria. Most of it is well populated and especially so near Changchun on the south and concentrating at trade marts on the Sungari. Where the Nonni river joins the Sungari to make of the combined stream one of sufficient size and depth for steam navigation to Harbin and beyond a cluster of closely situated towns has also concentrated population in this western portion of the zone.

As the Sungari river system is the principal exception in Manchuria to the present fact that it is the railways which are generally responsible for dispersion of immigrants and hence partially the cause for the actual creation of the settlement zones, it may be well in brief to characterize the rôle this mighty river has played in settlement of Manchuria. Like the Liao to the south which centuries ago furnished the means of access to southern Manchuria for the first Chinese colonists the Sungari has been the natural water magnet to whose banks the colonists have come. To-day the whole course of the Sungari river, over a thousand miles in length, is settled with varying degrees of density by Chinese. Even the nomadic peoples of past centuries were attracted to the banks of the river, but these have long since been displaced entirely by the Chinese until only the fast vanishing remnants of their once vigorous stock can be found far to the north along some of the tributaries of the still mightier Amur.

Chinese farming industry is usually of the character which seeks the closeness of towns. If in a new country, the Chinese settle in closely congested hamlets, not more from the possible need of protection from without than from the fact of traditional communal customs within. Nowhere in Manchuria is this better exhibited than along the course of the Sungari where the river traverses the Changchun Northern Settlement Zone. Although for many decades much of this country has been well settled especially along the river there are still wide acres not far distant which well might be cultivated more intensively or initially brought under the plough.

As a water communication the Sungari river is unique among rivers in Manchuria.

The Sungari has been both the lode and the lodestone of the immigrants. As a watercourse, navigable at least by junks for almost the whole of its length from above Krin to where it empties into the Amur a thousand miles below, it has furnished a communication, however treacherous in places, for the Chinese settlers who had no other access to the outside world. As a source of wealth it drained and watered and often heavily wooded fertile lands and its waters furnished fish for those who lived along its banks. The influence of the Sungari river on settlement below Harbin will be treated together with the Lower Sungari Settlement Zone.

Being on the main route of immigration into North Manchuria, the Changchun Northern Zone each year has absorbed many of the Chinese settlers who by the hundreds ot thousands now detrain annually at Changchun. In 1927, of the 435,000 immigrants who during the first six months detrained at Changchun or arrived there on foot from the south—a number estimated to be 50,000—it seems that about 35,000 actually remained in the zone characterized. Of these the greater portion, upwards of 25,000 entered the zone to the northwest of Changchun, especially about the Nungan district. Most of the remainder dispersed on both sides of the southern section of the Chinese Eastern between Changchun and Harbin, a rolling prairie country generally well cultivated near the railway though partly given over to good grass lands.

VI —Western Zone of the Chinese Eastern Railway

Of the flood of immigrants which annually pours through Harbin from Changchun—about 400,000 during the first six months of 1927—the greater part continues east into and beyond the Eastern Settlement Zone of the Chinese Eastern Railway, a smaller group go west from Harbin, into and beyond the Western Settlement Zone of the Chinese Eastern while the remainder divide into two courses, the one, much the smaller, spreading out in the Hulan Valley Settlement Zone, the other, destined to be perhaps the most important of all, following the course of the river into the Lower Sungari Settlement Zone. During the past few years the ratio of dispersion in these zones, except for that in the newly opened Hulan valley region, and the steady increase into the Lower Sungari country, has been much the same, especially as between the two zones of the Chinese Eastern Railway. The eastern section has generally taken almost twice the number of the western.*

The Western settlement zone of the Chinese Eastern Railway because traversed and served by that line has drawn the population to the trade marts and their immediately contiguous territory, while to the north the population diminishes in density very rapidly. Most of this zone is exceptionally fertile. Anta, the principal trade mart of the zone, lies in the midst of that black loam country which has made of it one of the finest wheat and bean producing sections

*See K. Futamura "Manchurian Settlers in 1927" (Dairen, S. Manchuria), p. 74ff. S. Nakajima "Questions Pivoting upon Immigrants into Manchuria," The *Monthly Supplement* of the *Manchuria Daily News*, February 1928, p. 5 (This is based on the detailed study in Japanese just referred to). Both of these articles are based on the returns published by the Chinese Eastern Railway periodically throughout the year. These have been verified in a private memorandum to the writer from Mr. I. Pavloff bearing on dispersion of immigrants in North Manchuria and prepared in February 1928.

of Manchuria. It is the produce from about Anta which is the mainstay of the produce traffic of the Chinese Eastern Railway bound for Vladivostok. The unusually thick black soil, through the full depth of the railway cuts about Anta, may be seen from the Trans-Siberian trains that form at Harbin. Farther to the west near Tsitsihar, in the lowlands that produce the marketable soda and salt, the soil is naturally far inferior. The whole zone is almost exclusively agricultural.

Of the approximate 90,000 Chinese immigrants who entered this zone about one-third settled near Anta. Of the remainder about three fourths went all the way to Tsitsihar. It thus appears that at least 35,000 were carried by the Chinese Eastern Railway to Tsitsihar to which should be added those who arrived on foot. But as Tsitsihar is rather a distributing center for immigrants than a center of actual settlement it may be presumed that the majority of these entered the Nonni river valley. During the whole of the year 1927, however, it appears that at least 75,000 immigrants settled or entered to remain for the year at least in the Western Settlement Zone of the Chinese Eastern.

VII.—Eastern Zone of the Chinese Eastern Railway

The Eastern Settlement Zone of the Chinese Eastern Railway, like that of the Western Zone, lies immediately along the railway itself from Ashiho to Ninguta and from there still farther east to the Sino-Russian border at Suifen or at Pogranitchnaya. Most of the country beyond Uchimiho is mountainous as the railway cuts through the gaps in the northern ranges of the Long White Mountains. On both sides of the ranges, however, though more broadly toward Harbin and the west, stretch rolling prairies which tend to flatten eventually into the great Manchurian central plain. It is in the spurs of the Chang Pai Shan from Uchimiho across to Hailin near the Mutan river (Hurka) and Mulin beyond that the timber concessions obtained to supply the railway with necessary ties, timbers and lumber are situated. This zone is therefore at once agricultural and important for its lumber production. The agricultural produce of the region is extremely varied and includes wheat and rice. Up country in the river valleys, as in so many parts of Heilungkiang which has long been a source of supply because of its distance from a few wary eyes in Peking, the poppy is grown. But the poppy seems to have reduced in Manchuria with the improvement of transporation by railway. Incidentally, however, I have seen poppy fields in many places in Krin and within five hundred feet of the railway near Liaoyang.

Because about one half of all the immigrants who come to Harbin continue east over the Chinese Eastern Railway or into this settlement zone it has been presumed that this is the most important of all the settlement zones in Manchuria. This, however, is untrue. The zone of the Lower Sungari which lies to the north is at least of equal importance now and in future is destined to be more so. Practically 40 per cent. of the immigrants who entrain at Harbin to enter this zone leave the train in the vicinity of Uchimiho and Imienpo. These stations, because they lie near the tributary which enters the Sungari at Fengcheng, are but *points d'appui* to the Lower Sungari Settlement Zone. To ascertain accurately the number of these immigrants who settle along the railway or that larger portion who eventually are drawn into the Sungari region is impossible. Perhaps the number who eventually become settlers in the valley of the lower Sungari is about half of the total who enter the eastern zone by rail from Harbin, or in the first half of 1927 about 100,000. A like number perhaps settled in this zone itself.

But the distribution is irregular and at least several thousand in 1927 went all the way to Lake Hanka in the vicinity of the coal mines of that region. Thus, while the Eastern Settlement Zone of the Chinese Eastern seems to receive the largest single group of the immigrants to North Manchuria, a large part of them eventually find their way still farther north to the Sungari's banks.

VIII.—The Hulan River Zone

The settlement zone of the Hulan river valley has only recently become important. For a long time it has been but partially developed. The Hulan valley, like the region about Anta, is exceptionally fertile and the produce of this section is a great part of that carried to Vladivostok by the Chinese Eastern Railway. The region is served by the Hulan-Hailun Railway, which was opened to traffic from Hulan to Suihua in January 1927. This line which has at various times since 1905 been contemplated by several foreign groups and which was definitely granted to the Russo-Asiatic Bank for construction in 1916, though abandoned during the Great War, has been built with private Chinese capital. It is now being extended north to Hailun and the company plans within three years to continue the line to Mergen. The traffic returns of the new railway have more than justified the hopes of its builders. Already the export of grain from the territory served by the railway (not all is carried by the railway, however, as there is still much cart traffic) is in the neighborhood of a million tons annually. The management of the Railway estimates the population of the area served by the line as about 3,000,000, a figure larger than usually thought to be the case. A progressive increase both of production and of cultivated area is anticipated in the Hulan settlement zone.

The new railway by creating trade marts and giving vigor to such towns as Suihua and Hailungfu has served to attract immigrants to the areas yet undeveloped. At least 10,000 immigrants entered the zone from Harbin during the first half of 1927. When the railway is completed northwest to Mergen (Nungkiang) over a total distance of nearly three hundred miles it is anticipated by the management of the line that the acreage thus served will be four times that of the present. There is little doubt but that within the next five years the Hulan River Settlement Zone will absorb a hundred thousand immigrants.

IX.—The Lower Sungari Settlement Zone

Measured alike by present influx of immigrants and by prospects for the future absorption of these Chinese who come from the south, the zone of settlement characterized as the Lower Sungari River, is the most important in Manchuria. The area is served by the mighty Sungari river, the longest and most serviceable water communication entirely within Manchuria's boundaries. The zone itself is located on both sides of the lower Sungari river below Harbin, but for convenience not only the territory contiguous to the river but that which lies still farther to the north in the angle formed by the confluence of the Sungari with the Amur is also included. The settlement now in progress in the Sungari valley blends by imperceptible degrees of change into that of the lower Amur in North Manchuria. Because the Sungari below Harbin is navigable not only by the ubiquitous junks, which give it the appearance of a south China river at times, but also by deep draught steamers which for decades now have plied the river, the Sungari offers not only the best but the only direct communication with this settlement zone. No railway pierces the lower Sungari valley as yet except the Chinese Eastern Railway which edges the right bank tributaries of the stream near Harbin.

The rôle which the Sungari has played in attracting settlers to its banks has been characterized for the sections of the river above Harbin. Between Petuna and Harbin there is a lively traffic on the river, but between Harbin and T'ungkiang, where it joins the Amur to flow to the southern straits of the Okhotsk Sea, the river carries in this section no less than 75 per cent. of all the cargoes of its entire course.* And it is interesting to note that while formerly most of the produce of the Sungari was carried down stream to supply the Russian Far Eastern settlements on the Amur, the wheat for the Russian mills, and the beans for eventual export from the port of Nikolaevsk at the Amur's mouth, now all this is changed and all the produce of the lower Sungari is marketed through Harbin.† The service of the river has been drawn upon by the Chinese immigrants who for decades have slowly seeped into this area, but who in recent years have come by the thousands principally by boat down the river or overland or down the rivers tributaries from the zone of the Chinese Eastern Railway. Accessibility, plus the fact that the river by building towns along its landings has necessitated more careful administrative attention on the part of the officials and hence has given a measure of protection for life and property not so assured in the uplands from the river, have fostered increased settlement. But that factor which is of greatest importance is the natural fertility of the soil in the valley of the Sungari.

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*Lubimoff and Gorlanoff, "The Sungari River: economic description of the most important landings and the districts of Heilungkiang and Kirin provinces which they serve," *Manchuria Monitor*, No. 3, 1927, pp. 11-17.

† The most extensive materials in English bearing on the characteristics of the North Manchurian industries are contained in the publication of the Chinese Eastern Railway titled "North Manchuria and the Chinese Eastern Railway" (Harbin, 1922).

Particularly is the land along the banks of the Sungari fit for agricultural development. The Sungari below Harbin flows through a rolling or even rugged country through much of its course and its basin is not part of the great central Manchurian plain. But the land of the valley and most of its tributaries is fertile, as evidenced by the fact that even at the present stage of development the landings of the river collect some twenty million poods (one pood equals 36 pounds) of cereal produce annually for transportation by river craft.* Nor does this include that carted overland to the stations of the Chinese Eastern Railway. As the cultivated area in the Lower Sungari Settlement Zone is still considerably smaller than that which profitably can be tilled there is a certainty that production will increase progressively with settlement.

Available land for agriculture, that factor of prime importance, is supplemented by the presence of wood for fuel and for construction of dwelling houses which does facilitate settlement. Much of the country along the river is wooded though the marketable timber now lies rather back in the tributaries. The scrub timber and second growth since the cuttings of twenty years ago are of value to the settlers.†

It follows that practically all of the Chinese immigrants who now are penetrating so far north into the Lower Sungari Settlement Zone are farmers or farm laborers with their families. Less and less are the immigrants attracted by pursuits other than farming although in 1927 a small number actually proceeded beyond the river districts to take up work as section hands on the Ussuri Railway. From Harbin down stream the population diminishes progressively as one approaches the Amur with variations in concentration at three or four of the important trade marts on the route, especially Sanksing, a little less than half way from Harbin to the Amur. Mulanhsien, some seventy miles from Harbin, marks the beginning of the region which remains comparatively undeveloped and from this point on down the river the zone offers the greatest attractions for settlers. To this should be added that of the Lopei district farther north on the Amur. This latter roughly triangular territory near the confluence of the two great rivers drawn from the three towns, Kouch'uan, T'ungkiang and Lopei as apices, is now attracting many settlers and the local authorities, particularly the district magistrate of Lopei, are offering vast areas of virgin lands rent free to the immigrants. San Hsing, which is situated approximately in the center of present settlement, is very near the fifteen thousand acre experimental ranch obtained from the Chinese authorities by the former customs official, Mr. L. S. Palen, and which was later managed by the late Major Morgan Palmer whose high motives and untiring energy made of the undertaking a most valuable object lesson.

To give accurate figures of present annual immigration into the zone of the Lower Sungari is impossible. Perhaps no less than 150,000 settlers entered the zone in 1927, or even that many in the first half of the year. The difficulty of stating more or less exactly these numbers arises from the fact that no figures are available for the large group who trek across country from the railway north or down the tributaries to the Sungari especially to Fangcheng. Some idea of the general movement on the river, however, can be had from the fact that during the first six months of 1927 approximately 40,000 more passengers boarded boats (presumably steamers) at Harbin destined down the river than landed there. During this same period approximately 50,000 immigrants arrived in Harbin over and above those who subsequently went east or west into the zones served by the Chinese Eastern Railway. Nor is it possible to estimate the transportation of immigrants by the many junks which ply the river.

That the Lower Sungari Settlement Zone is not only now but in future is destined to continue the zone of greatest attraction for the Chinese immigrants from Shantung and the south is evident alike from the present movement and the potentialities the region represents. The late Major Morgan Palmer, than whom none had more intimate acquaintance with the heart of the region, characterized the Lower Sungari zone as "indeed a country of the future, where natural resources are almost unlimited, and an abundant labor, near at hand only waits for the opportunity to increase the world's food supply.

Economic Effects of Colonization

Obviously the greatest effect of the whole movement to Manchuria, that which is of the most profound human value, is that upon the immigrants themselves. Truly they have bartered their birth right of living in their ancestral home for a mess of pottage, but what a welcome mess. However great their hardships in Manchuria they can at least be survived. Not so now in Shantung where famine stalks the land rendering hundreds of thousands homeless, starving and destitute. For these Manchuria is, indeed, a promised land. That the great majority of them will find a measure of prosperity and happiness is self-evident, climate, bandits, taxes, official extortion, land "sharks" chicanery and bad money to the contrary notwithstanding. No doubt a part of their earnings will in future, as in the past, find its way back into Shantung to continue that very interesting economic relation between Manchuria and Shantung. But the colonists themselves, after the usual unsettlement of the first year when the majority of them will work as laborers and not as land owners or even lease holders, eventually will grow in economic strength; at least they will produce the means of sustenance for themselves. But the variant vicissitudes of these settlers during their first few years in Manchuria is a subject beyond the scope of this study.

In twenty years the population of Manchuria seems to have increased by ten millions. The degree to which immigration is responsible for this in not easily known. As early as 1907 an investigator placed the number of permanent settlers for the year at not less than 20,000. In 1920, from British consular estimate, 100,000 were assumed to have settled in Kirin province alone in the previous eight years. Since then immigration has increased rapidly and in 1926 approximately 250,000 of those who arrived during the year seemed to have remained in Manchuria. The following year no less than 57 per cent. remained in Manchuria, or approximately 550,000.

Of those who remain in Manchuria only a part actually reclaim wastelands, the others hiring out their services, not infrequently in regions already fairly well under the plough. In Harbin during the summer of 1927 several residents whose occupations gave them considerable intimacy with the conditions of settlement in North Manchuria estimated for me that principally due to the continuous stream of colonists into the region the cultivated area was increasing from five to fifteen per cent. annually. This was especially noticeable in 1926 and 1927. To indicate the effect of recent settlement upon cereal production in Manchuria, however, is extremely difficult. The generally bumper crops in Manchuria in 1927 were due far more to a favorable season than to increase of cultivated area. Further it is important to note that over two-thirds of all a given farmer produces is actually concerned in his home, another ten per cent. is marketed locally, and it is only when his crop is exceptionally good that a fourth of the whole actually is exported beyond his own locality. Having allowed for this increased native consumption of produce, however, there is no doubt but that each year an ever enlarging percentage of the export increase is due to this progressive settlement. The grain export over the Chinese Eastern Railway from North Manchuria, the principal field of settlement, has increased during the last five years by 75 per cent., and in the last ten years has trebled. Observation of isolated zones of settlement in this matter is far more instructive than resort to statistical totals.

Of importance too is the effect of this immigration and settlement upon markets, markets which vary from cotton drills to railway tickets. Twenty years ago a Japanese who was president of a leading cotton spinning company in Osaka characterized the Manchurian market as one of the best in the world for cotton textiles. To-day it is a market for very much more. True, most of the population require little of manufactured goods other than clothing; they are still in the stage of production for self-consumption. But from 1916 to 1925 imports into Manchuria by way of Dairen, the principal importing port, increased 125 per cent., considerable, indeed, but far less in proportion to the rapid increase of exports. Of the imports, however, a very important item is that of railway materials for construction, service and maintenance, 80 per cent. of all the rails which China received in 1926 going to Manchuria. It is obvious that the extension railways is at once fostered by and is itself the cause of immigration into Manchuria. Except for the Sungari river the railways are almost the exclusive routes of approach to the settlement zones, albeit many of the immigrants walk the tracks, even from Dairen to Harbin.

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* Lubimoff and Jorlanoff, p. 11.

† Major Morgan Palmer, "Colonizing in Manchuria" (Undated reprint from *The China Weekly Review*, perhaps 1924).

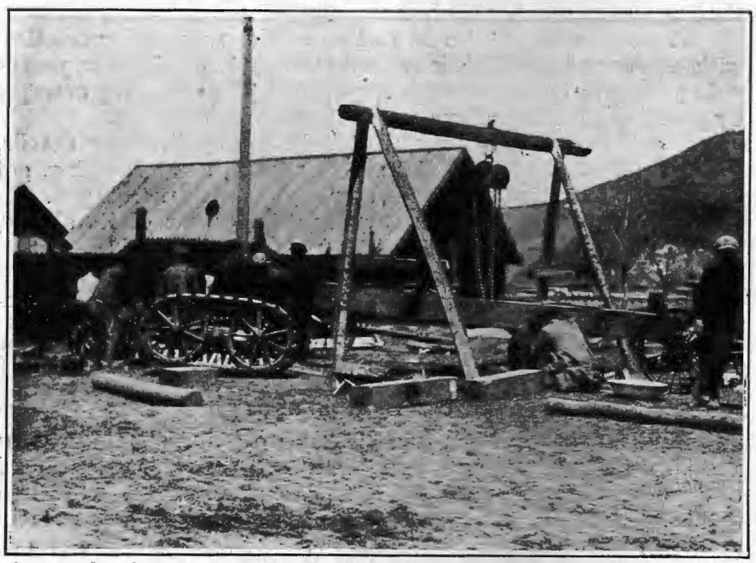
A New Development in Mechanical Transport in Northern Manchuria

A HOLT Caterpillar Tractor "60 logging cruiser" manufactured by the Holt Caterpillar Tractor Company, and a train of three truss wheel logging wagons manufactured by the Athey Truss Wheel Company, were recently delivered to the Chinese-Eastern Railway by Andersen, Meyer & Co., Ltd., to operate on the Railway's timber concession approximately 300 kilometers from Harbin.

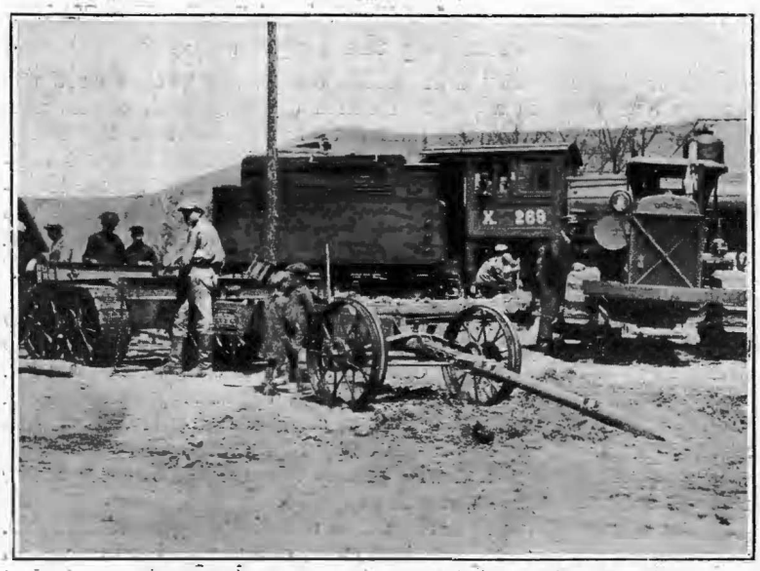
The concession, which comprises approximately 900,000 acres of forest, is situated in the region of Shihtou Hotze, a comparatively small town about 300 kilometers from Harbin on the Vladivostok line. From Li Ta Ho Tze the Forestry Division of the Railway have constructed a branch line running for 35 kilometers into the forest and at the rail head of this branch line there is considerable building activity at present in connection with erecting quarters for office and logging crews in anticipation intensive operation during the next several years.

No. 1. Caterpillar and Athey Wheel Equipment as Delivered at Shihtou Hotze

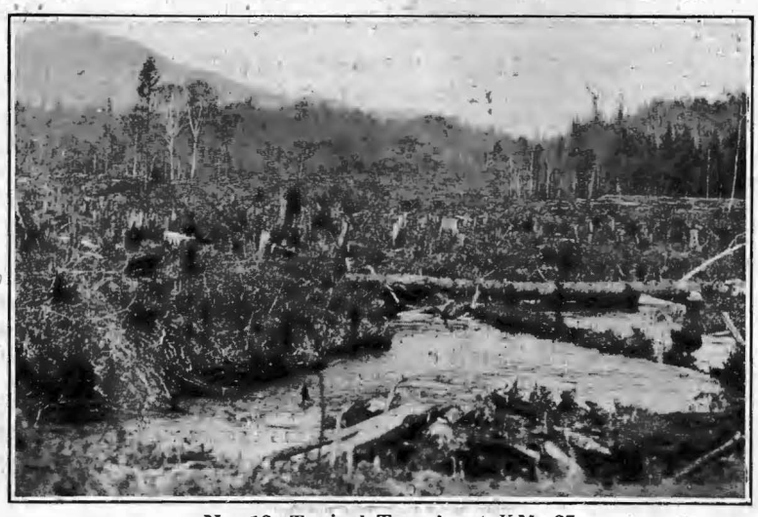
Only a comparatively small portion of the timber has been logged off in the immediate vicinity of the branch line, and there are enormous tracts of forest comprising both hard and soft wood which are as yet untouched. Operations have been somewhat hampered by the fact that this entire district is infested with Hung Hu Tze, and in order to avoid difficulties with these gentry the Railway



No. 2. Assembling Athey Wagon at Shihtou Hotze



No. 3. Athey Wagon Assembled at Shihtou Hotze



No. 13. Typical Terrain at KM. 35

No. 14. Athey Wagon Crossing River Shown in Photograph No. 13

Kailu-Tungliao Railway.—Plans for the construction of the 198 *li* Kailu-Tungliao railway have now been completed and surveys made by engineers appointed by the Ministry of Communications. Initial expenses of $500,000 will be advanced by the Ministry of Finance, and the Peking-Mukden Railway will supply two-thirds of the rails and ties. The remaining third will be taken care of by the Mukden authorities. Work is to begin sometime in May.

Motor Boating in Malay.—A Malay Marine Motorist speaks in enthusiastic terms of his Brooke "Empire" Runabout, and states that the craft is creating considerable interest amongst road users in Malay, being the first standardized launch built on motorish lines that has appeared there.

This "Empire" Runabout, a 10-h.p. four seater 16 M.H.P. craft equipped and run like a car, is claimed to be the most up-to-date craft of its type produced in England.

The makers Messrs, J. M. Brooke & Co., Ltd., of Lowestoft are steadily increasing their Overseas business with this model—a standardized boat—which they are now supplementing with their seven seater launch, on similar up-to-date lines, but driven at 30 M.P.H. by a 100-h.p. Brooke engine of new design.

Shikisan Denki Tetsudo K.K. (Shikisan Electric Railway Co., Ltd.) A New Company.—A general meeting for establishment of the company was held on May 19. Promoters are the Osaka Denki Kido K.K. and Shiki Ikoma Dentetsu K.K. Details are as follows:

Capital: Y.750,000, paid in Y.187,500.
Management: President: Torao Taneda. Special Managing. Director: Sadasuke Yamaguchi. Directors: Oto, Araki. Auditors: Takakuwa, Nakatani. Advisors: Mitsuaki Ota and Mataichiro Kanamori.

The company plans to construct an electric railway and cableway between Nishiguchi, at the foot of Mt. Shiki and the Yamamoto Station on the Onchi Line of the Osaka Denki Kido K.K.

Notes on some New Companies:—Tokyo Omiya Denki Tetsudo K.K. (Tokyo Omiya Electric Railway Co., Ltd.) A general meeting for establishment of this company was held on April 10. Chairman of the organizing committee Mr. Tsunehei Moroi reported details and following plans were made for establishment:

Capital: Y.6,000,000.
Number of shares: 120,000, Y.50 a share.
First Payment: To be called, Y.5 a share.
Bonus for Directors: To be less than Y.30,000 a year.
Officers were elected, as follows:

President: Tsunehei Moroi, Special Managing Director: Sanehiro Tanabe, Iyeji Uemura, Shiro Yamazaki.
Directors: Gosuke Imai, Shintaro Ohashi, Tatsutaro Hara, Noboru Oka, Mataichiro Kanamori, Naokata Kataoka.
Auditors: Mitsuteru Ota, Yajuro Namiki, Sumisaboro Uemura.

Sunfu Denki Tetsudo K.K. To Start Construction (Sunfu Electric Railway Co., Ltd.)

Subscription to shares of this company has been completed recently. Construction of the projected line of 15 miles 10 chains between Mumazu City and Iriyamase Station on the Fuji Monibu Tetsudo K.K. line will be started some time in September this year, to be completed before the end of May, 1929, at the latest. Power will be bought from Tokyo Dento. The company is capitalized at Y.1,800,000.

Kwanto Suiryoku Denki K.K.—(Kwanto Hydro-Electric Power Co., Ltd.)—The shares of this company have been rising recently, from the low rate of Y.16 to about Y.20 on Y.30 paid issue. The price is still comparatively low.

This company is now constructing a hydro-electric power station on the Tone River, capacity rated at 66,000 k.w. The foundation work has been completed and the remaining construction is expected to be completed before November this year.

The cost of construction is estimated at a total of Y.25,000,000, compared with the authorized capital of Y.17,000,000 of which Y.10,200,000 is paid in. This company raised a Y.10,000,000 loan from trust companies, interest at 7.3 per cent. at the end of February. This company expects to call up capital at the rate of Y.10 a share or a total of Y.3,400,000 before long. The ten million yen loan matures in one year, when it will probably be replaced by a debenture issue.

Power to be generated will be sold to the Tokyo Dento. The operating capacity is estimated at 55,000 k.w., to be sold in three parts, 18,300 k.w. for the first year, 36,600 k.w. for the second year, 55,000 k.w. for the third year. The price is contracted for at Y.80 a k.w. a year. Tokyo Dento is likely to ask for a reduction, but will probably be refused, although some reduction is expected to be inevitable.

On the basis of the present contract, power income may be estimated as follows; the first year is not considered.

Second Year:	Power Income	Y.2,933,000
	Operating Expenses	800,000
	Interest to be paid	740,000
	Balance Profit	1,393,000
	10.2 per cent. of the paid in capital of	Y.13,600,000
Third Year:	Power Income	Y.4,400,000
	Operating Expenses	800,000
	Interest to be paid	740,000
	Balance Profit	2,860,000
	21 per cent. of the paid in capital of	Y.13,600,000

For the second year a dividend of 7 or 8 per cent. will be possible, for the third year of more than 12 per cent. a year, provided no further call be made. At 10 per cent. reduction in price, the estimate will be as follows:

Second Year:	Power Income	Y.2,640,000
	Operating Expenses	800,000
	Interest to be paid	740,000
	Balance Profit	1,100,000
	8 per cent. of the paid in capital of	Y.13,600,000
Third Year:	Power Income	Y.3,960,000
	Operating Expenses	800,000
	Interest to be paid	740,000
	Balance Profit	2,420,000
	17.5 per cent of the paid in capital of	Y.13,600,000

For the third year a dividend of 12 per cent. a year will be practicable, at which rate the present price of Y.20 on Y. 30 paid shares is comparatively low.

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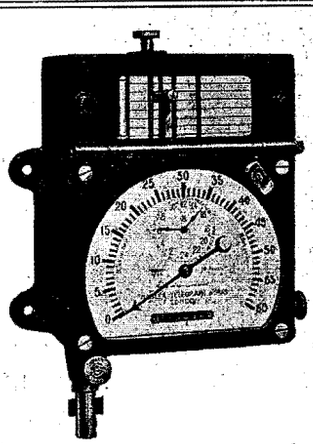

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Chart Feed on a Mileage Basis of 10 m/m per Mile.

INDICATES:—Speed.
Total mileage since application of Instrument.
Total mileage of each run.
Time of Day in Hours and Minutes.
RECORDS BY SILVER STYLUS:—Speed attained at any point of run.
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Distance covered.
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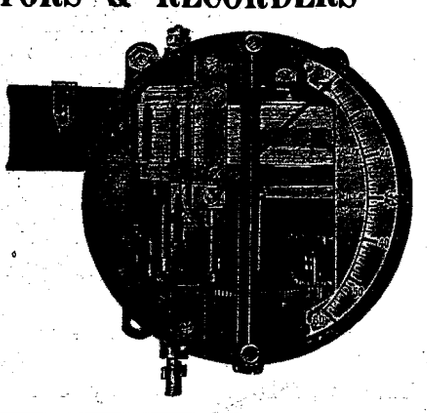
RECORDS BY NEEDLE PUNCTURES:—Speed attained at any point of the run.
Time the engine or coach is at work.
Distance covered.
Duration and point of stops.
If desired bell can be fitted to ring at predetermined speed, or apparatus to record working of Westinghouse or Vacuum Brakes.



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Engineering Notes

Hong Kong Enterprise.—According to "The Times" it is officially announced that the Imperial Government is contributing £100,000 towards the cost of establishing a civil and military aerodrome at Kaitak, near Kowloon City.

Kumagawa Denki K.K. (Kumagawa Electric Co., Ltd.)—It is reported that the company has applied to the authorities for a license to build a new power station on the upper stream of the Hishita Main River in Nishi Shifushi Mura, Soo Gun, Kagoshima Prefecture. The projected water way is 388 ken long, and the water flow is estimated at 250 cubic feet a second, theoretical horse power 3,580 h.p. or 2,000 k.w.

Ujigawa Denki K.K. A New Substation.—The company is now constructing a new substation at Yawata Machi, in Shiga Prefecture, capacity 6,000 k.v.a. Equipment has been ordered from the Hitachi Engineering Works, to be delivered some time in August this year. Power will be transmitted from Uji Power Station at 55,000 volts, to be reduced to 22,000 volts at the new substation, to be supplied in the Omi Branch District.

Hakata Denki Kido K.K. (Hakata Electric Tramway Co., Ltd.).—The Kyushu Suiryoku Denki K.K. (Kyushu Hydro-Electric Power Co., Ltd.) is planning to establish a new subsidiary to take over the electric tramway business in Fukuoka City and vicinity. Properties to be transferred to the new company will probably include lines in Fukuoka City, Yoshizuka line and Jonan Line.

The new company will be capitalized at Y.2,000,000, of which Y.500,000 will be called up.

Showa Denryoku K.K. (Showa Electric Power Co., Ltd.) The construction of the dam at the Shokawa No. 2 Power Station has been completed earlier than originally planned and trials are now being made. Construction which still remains includes only minor parts inside the station, also a transmission line of 197 miles between Yatsuo Substation and Shokawa by Daido Denryoku. These will be completed before the end of November.

Power to be generated of 45,000 k.w. will be supplied to Daido; transmission will probably be started by the end of this year.

Construction of Changkiawan-Tehhwei Railway.—Although the plans of the C.E.R. for the construction of the 30 *li* railway between Changkiawan and Tehhwei, Kirin province, were rejected by the government last year, prominent business men of Tehhwei have now convinced the local authorities of the necessity for the line. It is claimed that instead of inconvenient porterage by road, a light railway for horse cars will be immensely profitable. With increased profits, steam traffic can eventually be used. It view of its value as a feeder it is learned that the G. E. R. is willing to supply both capital and material for construction.

Soy Bean Casein, Japan.—The process for manufacturing soy bean casein was discovered some seven years ago and the patent was bought from Sato, the discoverer, by the Sankyo Drug Co., of Tokio, which started to manufacture casein, hoping to replace the imported milk casein used in Japan with soy bean casein. The cost of manufacture of this casein was too high to compete with imported milk casein and it was also found that soy bean casein absorbed moisture to a large extent and was not suited for Japan's climate. The largest users of casein in Japan are manufacturers of plywood and veneer. It was found that soy bean casein, when made into glue, lost its elasticity during damp weather. Professor Matsumoto has discovered a method of making soy bean casein and is using it in the manufacture of paracasein, which is a new venture, and according to the Department of Commerce it will be at least a year before it will be able to produce in appreciable quantities. There seems to be little competition between soy bean and milk casein unless manufacturing methods can be discovered which will overcome the disadvantages.

Conservancy in North Manchuria.—For the improvement of river traffic, Harbin authorities have created the North-eastern River Conservancy Bureau which will specially undertake the work of dredging the Sung Hwa River. A German engineer has been engaged to supervise the work.

Wireless Telegraphy in Kwangtung.—In view of the difficulty in sending messages through military wireless stations, the Kwangtung provincial authorities have erected a station near Shameen to be used exclusively for commercial purposes, maintaining a direct service from Canton to Hongkong.

Roads for Kwangsi Province.—The Kwangsi Department of Public Construction has mapped out four main roads with numerous branch roads, totalling some 7,000 *li* long, half of which have already been completed. Work is now being done on the 600 *li* road from Wuchow to Pinglo. One branch of this road goes from Hobsien to Fuchwan and connects with Yungming, Hunan province, while another branch joins Hsintu and Kwangning, Kwangtung province.

Mukden and Paiyintala Connected.—Direct passenger traffic and a mixed train service between Mukden and Paiyintala was inaugurated on June 20 *via* the Peking-Mukden Railway and the Tahushan-Tungliao Railway. The question of extending the Angangchi-Tsitsihar Railway is to be taken up shortly. Two thousand coolies have already been recruited for the work which comprises the construction of a viaduct across the Chinese Eastern Railway and a 21 mile track to Tsitsihar. Further extensions into to rich agricultural country of Nengkiang are contemplated.

Flying Boats in Chekiang.—Passenger service on the Chientang River, Chekiang Province, is speeding up. Another attempt is being made to cover the five-stage journey to Chuchow, in the space of eight hours. Three flying boats are in service, and are a cause of wonderment to people of the inland cities. The provinces of Kiangsi and Chekiang are at last being joined by a highway which will permit of motor traffic. The modernizing of this important gateway to the three provinces of Kiangsi, Chekiang and Fukien is an important step and will revolutionize trade connections with the coast.

British Taxis for Hong Kong.—It is not without interest to note that the standard form of British Light car is particularly adapted to dividend-earning purposes. Rootes, Ltd., of Devonshire House, Piccadilly, London, W.1, who have the sole world-exporting rights for this make, announce that they have recently supplied a fleet of 12/35 h.p, Clynos for use as taxi-cabs in Hong Kong. They are finished with the standard 56 in. track, and with specially designed body-work.

Hong Kong is to be congratulated upon having secured what must certainly be amongst the smartest and quickest public service vehicles in the world.

Construction Work for Kwangtung, Kwangsi, Yunnan and Kweichow.—As the development of the four south-western provinces depends on sound financial conditions and better communications, representatives of the Kwangtung, Kwangsi, Yunnan and Kweichow provincial governments recently drafted regulations for the organization of a bank to be known as the Industrial Development Bank of the four provinces, and decided on the installation of wireless stations in each province. A suitable location will be selected for the bank as soon as the project is approved by four provincial governments. As telegraphic communications have often been satisfactory it has been decided to use the military wireless stations in Kwangtung, Kwangsi and Yuunan provinces for commercial purposes, and as there is no wireless station in Kweichow, seven stations under the control of the Kwangtung army will be moved to Kweiyang so that wireless messages can be sent to Kwangsi and from there repeated to Kwangtung, Hupeh and Hunan provinces.

Wireless for Shanhaikwan.—Mukden authorities are making great strides in the installation of wireless stations. Those at Harbin, Changchun, Tsitsihar, Yingkow and Hulutao have either been completed or are nearing completion. An up-to-date wireless apparatus has just been bought for the Shanhaikwan station which will be installed in three weeks.

Anta-Paichuan Railway.—As the projected Anta-Paichuan branch of the Chinese Eastern Railway is in Heilungkiang province, the Central Government has notified the railway authorities that construction should be undertaken in conjunction with the Heilungkiang authorities. Russian and Chinese engineers have been detailed to make a survey and to report.

Gas By-Product for Japanese Lawns.—Ammonium sulphate, a by-product in the manufacture of gas, is being shipped by a gas company in St. Louis to Hawaii and Japan where it is used as a fertilizer, says the Pennsylvania Public Service Information Committee. This ammonium sulphate is a crystalline substance resembling white sand or salt, and is obtained by treating ammonia, a by-product of coal gas manufacture, with sulphuric acid.

It is being used extensively on lawns, golf courses and on fields in which food crops are grown, but where the soils are deficient in nitrogen. Recently, the company made one shipment of 336 tons of this ammonium sulphate to Yokohama.

Another gas company on the Pacific Coast is experimenting with the use of naphthalene for the control of insects in gardens. Naphthalene is another by-product of manufactured gas and is also used in the manufacture of moth balls. It has little fuel value and must be washed out of the gas before use, as it has a tendency to form deposits in gas mains which obstruct the flow of gas.

The Tahushan-Tungliao Railway.—The Tahushan-Tungliao Railway is a feeder of the Peking-Mukden line and taps country rich in cereals, live stock, skins and hides. The line begins at Tahushan, a station on the P.M.R., and terminates at Tungliao, both points being in South Manchuria. There are 16 intermediary stations, Haishan, Pataohao, Fangshanchen, Hsinlitun, Shihkiatze, Paotze, Kaokiatien, Changwu, Fengkiawupu, Changkutai, Aerhsiang, Kanchikai, Yihuta, Pahuta, Yamenying and Mulitu. Construction commenced in 1921 from Tahushan to Pataohao, a coal mining center, which was to be the terminus, but in 1925, in pursuance of the general policy of extending Chinese railways in Manchuria the line was extended to Hsinlitun, in 1926 to Changwu and in 1927 to Tungliao. Owing to lack of rolling stock and other causes the line at present is unable to cope with the traffic, there being thousands of tons of maize and *kaoliang* awaiting transport. Incoming cargo consists of piece goods and other foreign manufactures and outging is mainly agricultural products such as soybean, maize, *kaoliang* and millet. From November to May goods traffic is congested. Farm produce is marketed in November but there is always such an accumulation of stock that it takes the railways months to move it. From Kanchikai, Yihuta etc. of skins and live stock are exported. The line is 156 miles long and is connected with the Taonan-Angangki Railway. Through traffic between Tungliao and Newchwang, prior to the rise of Dairen the most important port in South Manchuria, was opened on March 15, this year.

The staple agricultural products of Tahushan and districts consist of *kaoliang*, abutilon and cotton. Local farm produce is carried to Tahushan to be railed to distant markets. According to the estimate of the local Chamber of Commerce about 50,000 piculs of *kaoliang* are exported yearly from Tahushan (picul=506 pounds), mostly to places in Chihli province. The current price for *kaoliang* per picul on the Tahushan market is $300, *fengpiao*, small money. The *kaoliang* is polished by motor-operated mills, worked by current from the plant of the Pataohao Mining Company. Between 600,000-800,000 catties of abutilon is also exported to Suichung, Sinming and other South Manchuria districts at about $7, silver, per picul. Five transportation companies are operating at Tahushan. *Kaoliang* exporters or buying agents who purchase through the transportation companies pay the latter a 10 per cent. commission. The local authorities levy a 1.1 *ad valorem* export duty on *kaoliang*, and the duty on abutilon is 2.75 per cent. The duty is paid by buyer and seller, equally in the case of *kaoliang* and entirely by the seller in the case of abutilon. Exchange between silver and *fengpiao* at the beginning of May was about 28 *fengpiao* to the dollar.

Vladivostok Builds Piers.—Plans have been made for the expenditure of about $3,000,000 in the next five years in improving the port facilities at Vladivostok, Siberia, according to information reaching the American Mail Line from agents in that city.

The Chinese Eastern Railway is said to be encouraging shippers to export their goods *via* Vladivostok rather than by Southern trade routes. Some of the largest bean oil manufacturers in Dairen have already removed their headquarters to North Manchuria in anticipation of the new changes.

Nippon Denryoku K.K. Plans to Absorb Fuji Denryoku.—This company has just signed a merger contract with the Sobu Denryoku K.K. which has franchise districts in Kanagawa and Tokyo Prefectures, effecting a complete connection between the Tokyo Substation and the Odawara District. The districts covered by the former Odawara Electric Railway and Sobu are not so important as far as supplies are concerned, and this company is now anxious to absorb Fuji Denryoku (Fuji Electric Power Co.) which supplies power in Yokohama City for units of more than 100 h.p. and has supply rights in other districts in Kanagawa Prefecture. It is reported that merger negotiations are now going on.

Investments in Rayon Industry.—Since March this year the Showa Rayon and Nippon Woollens have started operation of their rayon mills, and other rayon companies have published their extension plans, This is considered remarkable in view of a depression prevailing in other industries.

The Teikoku Jinzo Kenshi K.K. (Imperial Rayon Co., Ltd.), the oldest rayon company in Japan, began the second part of extensions at its Iwakuni Mill in Yamaguchi Prefecture, to be completed before the end of this year. The Asahi Kenshoku K.K. (Asahi Silk Weaving Co., Ltd.), Another leading company in the industry, has decided to resume the construction plan of Nobeoka Mill in Miyazaki Prefecture, Kyushu. Mr. Uehata, managing director of the company, left for Germany in March to buy the necessary machinery. Construction will be started probably on his return in August, and new products are expected to come out in the market some time in the second half next year.

The Toyo Rayon and Nippon Rayon have begun their extension programs, the former to increase the present capacity to eight tons a day, the latter to six tons a day. It is reported that the Tokyo Jinzo Kenshi and Miye Jinzo Kenshi are also planning for extensions. The Kurashiki Kenshoku K.K., a subsidiary of the Kurashiki Boseki K.K., will be able to sell its products this fall. A summary of investments made by these eight companies is given as follows :

Company	Established	Authorized Capital Yen	Paid in Capital Yen
Teikoku Jinzo Kenshi	June, 1918	21,000,000	21,000,000
Asahi Kenshoku	May, 1922	8,000,000	6,000,000
Nippon Rayon	March, 1926	15,000,000	6,000,000
Toyo Rayon	February, 1926	10,000,000	10,000,000
Tokyo Jinzo Kenshi	March, 1926	10,000,000	2,500,000
Miye Jinzo Kenshi	January, 1924	1,000,000	454,000
Showa Rayon	March, 1928	12,000,000	5,000,000
Kurashiki Kenshoku	January, 1926	10,000,000	2,500,000
	Total	87,000,000	53,454,000

which compare with the total authorized capital of cotton spinning companies of Y.464,000,000 the end of 1927, of raw silk companies of about Y.300,000,000. Considering the short history of the industry, this development is remarkable. At the end of January 1921 the total capital amounted to only Y.5,500,000, while the increase during the last eight years is 16 times that amount. Adding debentures of Teikoku amounting to Y.10,000,000, those of Asahi Y.3,000,000, investments other than capital of Toyo Rayon Y.5,000,000, Y.2,500,000 invested in rayon equipment by Nippon Woollens, Y.1,000,000 of Maruwa Orimono, Y.125,000 of Jinken Kogyo K.K., total investments in the rayon industry amount to Y.75,079,000. Extension costs are estimated at Y.5,000,000 Teikoku, Y.10,000,000 Asahi, Y.7,000,000 Nippon Rayon, Y.5,000,000 Toyo Rayon, Y.500,000 each Tokyo Jinzo Kenshi and Miye Jinzo Kenshi, total Y.28,000,000. These funds will be raised either by calling up capital, increasing capital or debenture issue. Under the circumstances, the total investment may amount to more than Y.100 million before the end of this year.

Armory Turned into Factory.—The Political Committee has decided to use the old buildings of the Heng Chang Armory in Changsha, Hunan province, for the Min Sen factory, producing goods for poor people.

Long Distance Telephone for Kwangtung.—General Chen Chi-tang has decided to install a long distance telephone between Canton, Kwangtung province, with branch station at Shiuhing and Wuchow, Kwangsi province.

Pottery Works Re-opened.—Since the suspension of operations last winter by the pottery works in Liling, Hunan province, workers in this trade have suffered greatly. $5,000 have been appropriated by the local authorities to re-open the works.

Limchow-Shiuchow Road.—The Department of Construction of Kwangtung province is preparing to build the 220 *li* road from Limchow to Shiuchow, passing *Yuyuan*, in order to increase transportation facilities between Kwangtung, Kwangsi and Hunan provinces. A special construction bureau has been organized with Wang Ching-yu as its head and the magistrates of the three *hsiens* as assistants.

New Silk Filatures for Wushi.—The filature industry in Wusih, a well-known raw silk producing center of Kiangsu province, is growing very prosperous. Most of the filatures are making handsome profits, as their product always finds a ready market in foreign countries. In 1921 there were nine filatures in the city, with a total of 2,532 reels, but the number has now increased to 21, with a total of over 5,000 reels. This Spring four new filatures were established, each equipped with over 200 reels.

Through Traffic for North China Railways.—Although the long interrupted Peking-Hankow Railway has resumed traffic, Pukow trains will have to pass along the Lung-Hai Railway to come to Peking owing to the damage to the great bridge over the Yellow River near Tsinanfu. The Director of the Railway Department of the Nationalist Government is now arranging through traffic for trains from Pukow *via* the Lung-Hai Railway from Hsuchow, to Chengchow and thence by the Peking-Hankow Railway to Peking.

Kirin-Hailung Railway.—Work on the Kirin-Hailung Railway is making rapid progress. All the necessary materials were transported by the Mukden-Hailung Railway last winter. The Kou Shan, Chang Kang and Yen Tung Shan tunnels have been completed. The Lao Yeh Shan tunnel will be finished in a few days, and all the bridges will be finished in two months. On the completion of the bridges rails will be laid from Chaoyangchen to Kirin, and it is expected that traffic between Hailung and Yen Tung Shan will begin in October and be extended to Kirin by the end of the year.

New Roads in China.—Since the completion of the Northern Expedition, definite measures have been taken by various provinces for reconstruction, especially the building of roads and highways. Reports from Nanchang states that the Provincial Finance Department of Kiangsi has decided to appropriate $100,000 per month beginning from August for the construction of six main highways in the province: (1) the Kiangsi-Chekiang Highway, (2) the Kiangsi-Kwangtung Highway, (3) the Kiangsi-Hunan Highway, (4) the Kiangsi-Hupeh Highway, (5) the Kangsi-Anhwei Highway, and (6) the Kiangsi-Fukien Highway.

The Reconstruction Department of the Anhwei Provincial Government has also decided to repair and complete the following four trunk roadways in the Province: the Wuhu-Tunki, the Anking-Szechow, the Anking-Ningkwo, and the Shucheng-Pochow Highways. It is estimated that the total mileage of the four trunk roads will be 2,590 *li* (860 miles).

The program set out by the Highway Department of the Chekiang Provincial Government calls for the construction of the Hangchow-Changhwa and the Hangchow-Hweichow Highways. The roads connecting Shaohing and Ningpo, and Ningpo and Fenghua are now under construction and will be completed in the fall. Various motor roads are also being constructed in and around Hangchow.—*Kuo Min News Agency.*

Sub-Stations Equipments.—Railway electrification in Australia is still proceeding and additional electrical equipment for sub-stations has been ordered from the British Thomson-Houston Co., Ltd., Rugby. This plant is required in connection with the Sydney Suburban Electrification scheme of the New South Wales Government Railways, and includes B.T.H. transformers, rotary converters, and automatic starting equipments. The transformers will reduce the E.H.T. bulk power supply, in some cases from 33,000 volts and in others from 11,000 volts, to a voltage which applied to the rotary converters will enable these machines to feed the track at 1,500 volts. There will be 16 single phase transformers, each rated at 1,100 k.v.a., and ten 1,500 kw. 750 volt rotary converters, which will be connected two in series so as to give 1,500 volts. B.T.H. rotary converter plant aggregating 45,000 kw. is already installed in connection with the Sydney Suburban Railway Electrification scheme, so that when the equipment just ordered is installed the total will be 60,000 kw.

Among other orders of interest received by the British Thomson-Houston Company is one from the Calcutta Electric Supply Company, India, for a 2,500 kw. 6,000/450 to 500 volt motor-converter with suitable starting equipment, and one for the complete electrical equipment for 15 sub-stations, through which electricity for domestic and industrial purposes will be provided in Colombo, Ceylon. There is already an electrical supply in Colombo, but a re-organization and large extension of the area in which electric power is available is taking place, and the plant which the British Thomson-Houston Company is now called on to supply includes 20 three-phase, 50 cycle transformers, each of 100 k.v.a. rating, 3 of 280 k.v.a. 3 of 500 k.v.a. and one of 750 k.v.a., also 3 rotary converters of 250 kw. each, and a 667 k.v.a. frequency changer to give a single-phase, 60 cycle supply.

Chinese Cotton Mill Statistics.—The following China cotton mill statistics for the latter half of 1927 have been compiled by the Chinese Cotton Millowners' Association of Shanghai as per returns received :—

(1) *Number of Spinning Spindles :—*

	On December 31, 1927.	*On* June 30, 1927.	*On* December 31, 1926.	*On* July 31, 1926.	*On* January 31, 1926.
Spindles in operation ..	2,932,889	3,135,330	2,307,634	2,066,996	2,031,212
Spindles in course of erection	25,820	5,800	7,600	13,112	2,000

(It is estimated that there exist in the whole country about 3,500,000 spinning spindles).

(2) *Quanitity of Cotton Consumed :—*
(in bales of 500 lbs.)

	Half Year Ending. December 31, 1927.	June 30, 1927.	December 31, 1926.	July 31, 1926.	January 31, 1926.
Chinese cotton	409,410	498,363	421,567	426,762	361,859
American cotton ..	139,399	153,391	76,217	57,573	27,893
East Indian cotton ..	99,557	172,465	173,472	172,175	161,477
Egyptian cotton	504	308	367	180	285
Sundries	184	1,135	447	260	70
Total	649,054	825,662	672,070	656,950	551,584

(3) *Cotton Mill Stocks :—*
(in bales of 500 lbs.)

	On January 1, 1928.	*On* July 1, 1927.	*On* January 1, 1927.	*On* August 1, 1926.	*On* February 1, 1926.
Chinese cotton	149,146	86,138	102,727	131,996	100,953
American cotton ..	44,030	61,481	33,846	26,834	18,810
East Indian cotton ..	22,730	73,155	47,002	129,406	41,068
Egyptian cotton	357	545	190	70	80
Sundries	80	1,124	49	180	11
Total	216,343	222,443	183,814	288,486	160,922

(4) *Short-Time :—*

	Half Year Ending. December 31, 1927.	June 30, 1927.	December 31, 1926.	July 31, 1926.	January 31, 1926.
Number of spindles stopped	1,538,640	1,130,982	900,501	1,180,243	702,137
Average number of hours stopped	1,630	1,281	1,128	790	1,166
Number of weeks during which the spindles from which returns have been received were stopped ..	6.50	3.50	3.33	3.40	3.05

上海仁記路拾六號

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

THE SINO-JAPANESE DEADLOCK

ASIATIC WIVES OF AMERICAN CITIZENS

THE COMMUNISTS IN CHINA

THE RISE OF MODERN JAPAN

GENERAL PLAN OF COMMUNICATIONS

Vol. XXIV September, 1928 No. 9

SHANGHAI, PEKING, TOKYO AND MANILA

General Plan of Communications

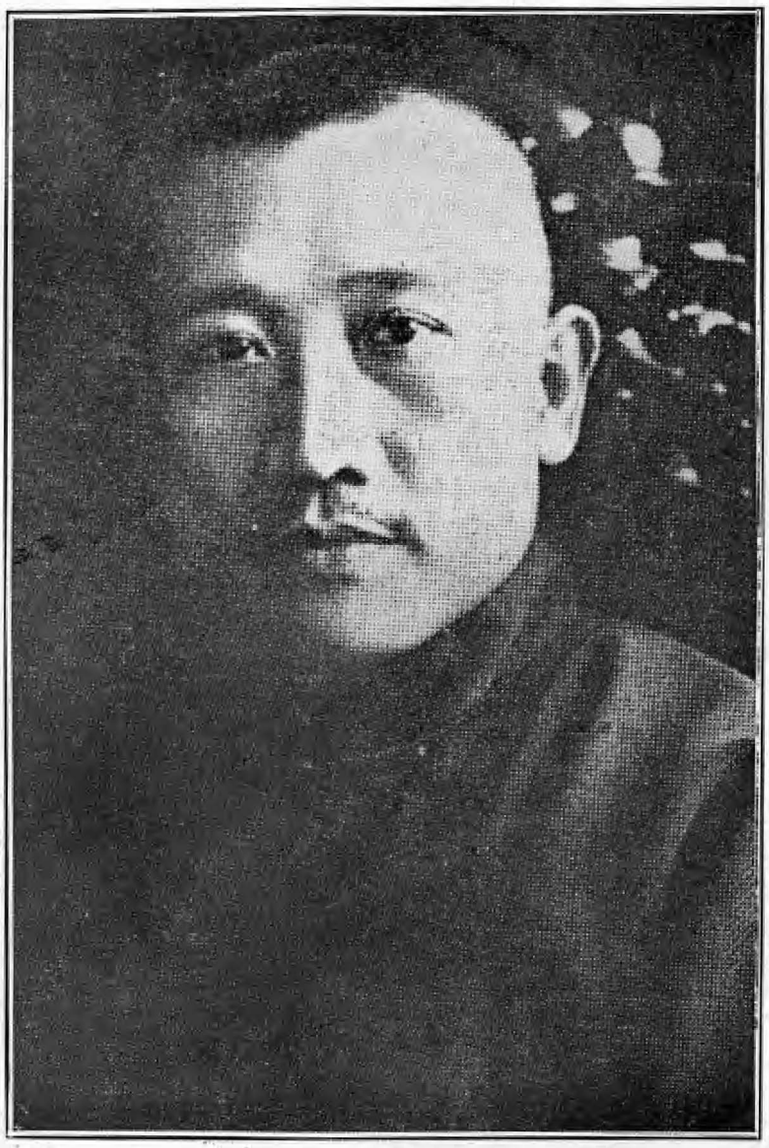
Rehabilitation—Construction—Betterments

By Wong Peh-chun, Minister of Communications, Nationalist Government

I.—GENERAL REMARKS.

(1) THE IMPORTANCE OF COMMUNICATIONS.—That the development of communications is of prime importance, is recognized by all countries in the east as well as west, for the enterprise of communications is the life of the constitution of a nation the standing of which and the livelihood of people being so closely connected. It is upon communications that all politics, military, finance, industry, economics and civilization depend. The nation is handicapped when the transportation schemes are interrupted, but once developed and thoroughly operated all industries will flourish and people prosper.

In spite of the fact that the railroad, telegraph, postal service and navigation, etc. have been organized more than several scores of years ago, they are still in primitive stage. With the exception of postal administration which is comparatively well organized but without progress due to the continuous warfare. There are altogether only 7,000 odd kilometers of railroad already completed, total length of 87,000 miles of telegraph, 50 and odd wireless stations, and 100,000 numbers of telephone. The government navigation has not yet been established, what commercial organizations possess are even not quite 400,000 tons. As to aviation and highway and all other methods of modern transportation have been either passed for introduction but still uncarried out or interrupted amid construction, that no comparison can be made between that of the European, American or Japanese. That the continuation of such state will lead to deterioration beyond imagination, it is the duty of this Ministry to see and exert for improvement and salvation.



Mr. Wong Peh-chun, Minister of Communications

(2) THE STATE OF PRESENT CORRUPTION AND THEIR CAUSES.—Owing to the heavy burden of foreign loans on one side and the continuous strife of civil warfare on the other, the primitive stage of communications in our country to-day with its weak foundation is on the verge of bankruptcy. Like a good doctor who would first diagnose his patient's case before prescription, the following is a brief classified statement of the present chaotic state and causes:

(*a*) LOANS.—Over $700,000,000 is the amount of loans borne by the Ministry of Communications up till the end of the 13th year of the Republic of China. As to whether new or temporary loans have been contracted by the ex-Peking Government during the years 14, 15, 16, and 17 are to be investigated. With the exception of three that are guaranteed by the salt revenue and consequently notified by debting nations of their deduction from the salt revenue, even the interest is unpaid when due not to mention the capital. The sum of $700,000,000 is not a tremendous loan for the country but considering the distance of not more than 7,000 kilometers of completed lines of railroad and some 80,000 miles of telegraph this amount is startling. In tracing the reason of this backwardness we find the hindrance of communications is due to incessation of civil war, the cause of which began before the years 14 and 15 when Yuan Shih-kai was in power. Utilizing the loans as an excuse for the construction of railroads he took advantage of it especially when elected president as all expenses were then provided by the administrations of communications. This led to all forms of corruption by individuals seeking personal favor and benefit without the least thought on the general welfare of the enterprise of communications. Worse changes occurred during the days of Anfu Party in power. Headed by Tuan upon the death of Yuan, loans to the total amount of about $110,000,000 were contracted. The loans were advanced for the construction of various railroads, telegraphs and telephones, but with the exception of Lunghai and Szu-tao lines which used part of the loans for construction not an inch of track has been laid on the other lines. During the Special Customs Conference in the 14th year of the Republic it was proposed by the ex-Peking Ministry of Communications to transfer these loans to the Ministry of Finance which the latter accepted inasmuch as they were not spent for the construction of railroads. To the Ministries of Finance and Foreign Affairs therefore these loans should now be apportioned leaving about $590,000,000 for the Ministry of Communications which alone will require about $50,000,000 every year for the return of capital and interest, an amount difficult to meet owing to unsettled condition of the country.

(*b*) CIRCULATING CAPITAL.—All incomes accrued and loans contracted are but to be temporarily kept by the Ministry's treasury or bank for proper expenses such as payment of interest, purchasing materials, extension and repairing works but the ex-Peking Government took it as profit and spent at will. Then followed the military transport and official telegram to be credited on account which, up till the end of the 12th year of the Republic reached the amount of $40,000,000. The Ministry of Finance drew more than $62,000,000 cash and the face value of floated loans reached about $11,000,000. Since the 13th year of the Republic, conditions became worse and together with that credited prior to the 12th year, at least an amount of over $240,000,000 were credited to this Ministry this way.

(*c*) PROPERTY.—Considerable loss has been suffered by the previous administrations, owing to civil war, as to machinery, works,

stations and their fixtures, especially rails, sleepers, bridges and telegraph poles. According to the record compiled in the 4th year of the Republic our government railroads possessed 1,140 locomotives, 2,169 passenger cars and 17,524 freight wagons, of which only about half of the numbers are now in good condition and service, the rest being either taken out of Shanhaikwan or out of order. Due to abuse and deterioration the time and labor would cost more than double to put them into proper condition again as would otherwise require.

(*d*) ADMINISTRATION AND STAFF.—The enterprise of communications is of technical nature and only men of specialized training should be employed in order to prevent such occurrences like cessation of telegrams, derail and wreckage of trains for the safeguard of lives and property. Since the interruption of communication by the militarists, there are corruptions too numerous to mention such as employment of own staffs regardless of qualification, embezzlement of funds, violation of regulations, etc. The communication administrations of other countries are all of commercial nature, their expenditure to meet income, but in our country to-day each railroad is splitted into sections, each under different managers without any mutual co-operation at all.

(*e*) BUSINESS AND OTHER CONDITIONS.—Besides the complete interruption of through traffic on the Peking-Hankow line for the last two years and other lines at various periods, the pile of untransported goods, absence of passenger service and whatever incomes of the railroad monopolized by the militarists leaving even not enough for the payment of staffs, there are three chief causes either due to unstrict regulations, lack of inspection or loose administration that led to corruption:

1. The corruption of transport companies their inaccurate report as to value, weight and rates;
2. The rebates and commissions offered by merchants in the purchasing of materials; and
3. Commissions on loans, interest on public funds, and etc.

(3) PLANS FOR IMPROVEMENT.—The first step for reorganization will start from the national point of view, the ultimate redemption in the future of national control of all forms of communications for the benefit of the nation's prestige and prosperity of people. The second step will be to afford co-operation by the mass, for monopoly the nature may seem profit are to be on equal basis with service for the benefit of public. Last but not least will be devoted to the abolishment of all customary bad habits formed by lack of competition or public spirit so that renewed energy can be produced.

In carrying out the above plan, owing to limitation of time and finance, steps can be introduced only one by one according to their importance. Three steps will be (A) Improvement of existing enterprises; (B) Plan for improvement and enlargement of enterprises urgently required; and (C) Planning of future enterprises.

II.—OUTLINES OF PLAN ON REHABILITATION OF COMMUNICATIONS.

(A) ATTENDANCE ON EXISTING ORGANIZATIONS.—

(1) Five Steps for Rapid Resumption of Normal Communication.

(*a*) To distribute standard forms to the different railroad and telegraph administrative offices to investigate and report on conditions of damaged railroad or telegraph lines and scheduled for quick repairs.

(*b*) To investigate the exact number of locomotives, passenger and freight cars, both good and damaged on the different lines, the condition of traffic, the state of wreckage and their repairing, and to effect a quick return of normal condition the number of work-shops are to be required of their expansion of day and night work.

(*c*) To abolish, according to regulations, more than one managing director appointed for the convenience of military transportation, or control of the whole line during warfare disregarding commercial transportation.

(*d*) At places where military operation exist a special military transportation bureau may be appointed by the highest officer in command of the army to co-operate with the managing director as to arrangement of cars. No retention of cars at will, participation of administration affairs, stoppage of commercial transportation, however, will be allowed.

(*e*) To repair and put into condition in quickest practicable time the Yellow River Bridge on the Tientsin-Pukow Railway which links the north and south.

(2) Eight Steps for Eliminating Corruption and Effecting Improvement on Present Condition.

(*a*) Investigation on damages suffered through military operations:

1. Property, circulating capital, wear and tear of effects, etc.
2. Total amount of difference in income as compared with that of the 11th, 12th, and 13th year.

(*b*) Liquidation of accounts.—

1. Unpaid interest, unpaid but due interest and capital, unpaid purchasing accounts, staff's salary arrears.
2. Adjustment of improper advancement of funds.
3. To prohibit valueless bonds and bank-notes to be mixed with cash account, and to investigate whether any payment in notes is credited into cash account.
4. To clear traffic accounts rapidly prohibiting undue long detention of huge funds.
5. To investigate the paying and receiving of accounts.

(*c*) The establishment of Supervising Committee of Finance for the centralization of financial power, appropriation of expenditure, and to look after loans and checking accounts. Under the supervision of this Committee will be a treasury for the safe-keeping of cash; purchasings, loans, and payments of comparative huge amounts should be first passed by the Committee and all other but necessary payments should be either included in the budget or sanctioned by the Minister. (Regulations governing its organization shall be drawn up separately).

(*d*) The establishment of Supervising Committee of National-Purchasing Affairs to centralize purchasings as well as encourage national product and manufacturing. The bulk of purchasing expenditure and the difference in wholesale and retail values, warrant the existence of this Committee who can at the same time not only purchase, compare, investigate and test by the specialist, but also open to nation-wide competition.

The following organizations shall be formed, particulars of which to be drafted accordingly.

1. Committee of Supervising of Purchasing Affairs.
2. Office of Testing Materials.
3. Store Depôt and Sub-depôts.
4. Material Yard.

Steps taken for encouragement of national product:

1. All administrations of communication to purchase national product at first choice.
2. To establish experimental office of national communication products and to employ experts to instruct manufacturing and improvement.
3. To establish museum of communication product containing both Chinese and foreign materials for exhibition.
4. To draw up regulations governing awards for national products.

(*c*) Employment of Staffs.—

Regulations governing the following clauses be drawn up separately.

1. Examination as to their education and experience.
2. Selection and protection of staffs.
3. Merits and demerits.

(*f*) Methods of better Treatment to Staffs and Laborers.—

1. To put into practice retirement bonus.
2. To regulate commiserate-funds for the deceased.
3. Institution for supplementing education.

(*g*) Revision of Railroad and Telegraph Tariffs.—

1. To standardize common railroad tariffs, allowing special rates for students and group touring, laborers and the poor and emigrants of specified localities.
2. To standardize freight tariffs and freight classifications.
3. To reduce telegraph rates until after installation of new wires and machinery.

(*h*) To standardize rules and regulations and use Chinese as official language.

(B) PLANS FOR THE IMPROVEMENT AND ENLARGEMENT OF EXISTING ENTERPRISES.

1. Railway Administrations.

a. Pingsuei Railway (Peking-Sueiyuan Railway)

1. Improvements on the works on Suei-pao section. (1) to reconstruct proper steel bridges, (2) to build all stations

buildings, (3) to install various equipments in all stations and (4) to construct the Huangho Wharf.

2. To install the interlocking signals and electrical staff on the whole line of Pingpao (Peping to Pao-ti; As signals and staff are important factors to the operating of traffic this line of a distance of more than 800 kilometers and consisting of 5 branch lines occupying the important location of the trunk lines in the north-west, the new system of the signals and staff should be immediately installed so as to facilitate the means of transportation.
3. To increase the number of engines and cars to meet requirements.
4. Enlargement of the workshop at Nankow and repair shops in various car-sheds.

b. Han-Ping Railway (Kinghan Railway)—

1. To reconstruct the Huangho Bridge. Cast iron system for piers was adapted for the existing Huangho bridge. The foundation was not deep enough and the bearing strength was not very high causing low speed of the traffic and increasing maintenance expenditure each year, and the time of guarantee of the bridge had long ago expired, a proper new bridge should be reconstructed. The design for the new bridge tender by the Anglo-Belgian Union Company costing more than $10,000,000 was the choice. Owing to the various disturbance of civil affairs, however, the work has not yet been carried out. A committee should now be formed of experts for the construction of Huangho bridge to continue designing and to have the scheme carried out.
2. To enforce all the bridges of the whole line. Copeer's standard from E-40 to E-45 had been mostly used by all railways, but E-35 was the only adoption of this line. For the benefit of Han-ping line itself and for the convenience of through transportation and inter-changing of engines it would be necessary to have all the bridges reinforced.
3. To enforce the track of the whole line. Up to now, still three quarters of the whole line are using light rails of 75 lbs. If after the reinforcement of the Huangho bridge and all the other bridges without enforcing the track, difficulty would still be felt and through transportation hindered. Since this line is the longest important trunk line in the country the replacement of heavy rails of 85 lbs. would be essential for the unification of railway system.
4. Construction of wharves at Hankow.
5. Purchasing of rolling stocks, including locomotives, passenger and freight cars.
6. Replacement of old sleepers. Under the previous scheme it had been decided to change into steel ties and the estimate was about 1,670,000 pieces for the whole line, 35,000 pieces of which was first ordered as first lot. Upon the arrival of the said cargo just during the breaking out of the civil war and no delivery has been made. This should be investigated as soon as the whole line is restored to its normal condition.

C. Tsinpu Railway—

1. The Ningpu Ferry—As the erection of a bridge would cost too much for the present financial state to bear, plans are under way for the introduction of ferry service by which both passenger and freight cars could be carried over in their original wagons.
2. Purchasing of more rolling stocks.—Since the military operation, engines and cars of this line has suffered greatly. Five trains composing of steel cars had been all commandeered by military leaving the rest poorly damaged. As it is the trunk line connecting north and south and forms principle communication leading the inland to the sea, it is necessary to purchase more cars for urgent needs and to meet the supply to all other lines.

D. Pin-feng Railway (Peking-Mukden Railway)—

1. Replacement of heavy rails outside the Great Wall. The section from Kinchow to Mukden which has a length of 238 kilometers is still using the light rails of 65 lbs. 85 lbs. rails should be replaced in order to make it uniform and facilitate traffic.
2. Rebuilding the Tientsin Station.
3. Purchasing more rolling stocks including locomotives, passenger and freight cars.

E. Lung-hai Railway.—This line passes through Kansu, Shensi, Honan and Kiangsu provinces connecting the big desert in the west and leading to the sea in the east, is the principle trunk line possessing an important character, but owing to the repeated military operations it had suffered heavy damages and destructions. The shortage of the rolling stocks should be amended by new purchase. The unconstructed portion of the line will come under the stipulations of the article for uncompleted lines, and the completed portion to be promptly adjusted.

2. Telegraph, Telephone, and Radio.—In order to improve electrical communication and encourage commerce the following betterments are to be introduced:

A. Telegraph—
1. Sounder, instead of Morse with reels for expense saving.
2. Duplex or quadruplex instead of simplex now unused in other countries.

B. Telephone.—
1. Automatic telephones like already installed at Shanghai and Tientsin to replace the old type.
2. Establishment of telephone exchange at telegraph offices to expedite news.
3. Long-distance telephone. (For particulars see Appendix No. 1).

C. Wireless Stations.—All existing wireless stations throughout the country to adopt "vacuum tube" abolishing all long wave and spark system transmitters as per decision of last year's International Wireless Conference.

3. Postal Service.

(*a*) Extension of mail lines throughout the country.—At present the total length of railway mail lines in the country is only about 23,000 li and that of steamer lines over 90,000 li, while courier lines have a total of over 703,000 li, among which some are day and night services and others are daily, bi-daily or once-in-two or three-days services. They are all served by foot couriers. This costs a large amount while the transmission is rather slow. Now that the construction of public motor car roads is being demanded in various provinces, the postal mail lines may be re-arranged and the public roads made use of. Besides, more mail routes may be established in various provinces and hsien districts, in order to make connections.

(*b*) To increase the number of postal establishments.—According to latest statistics, the post offices in the whole country give only a total of over 2,560; postal agencies over 9,600; rural box offices 7,000 and rural stations over 22,000. The statistics for 1926 show that the mail matter posted during that year totalled more than 580,000,000. This figure in comparison with the total population of 480,000,000 persons for the whole country, works out approximately at only one letter per person for a whole year, and that one Post Office had to serve 40,000 persons. The postal development at this ratio is rather slow. Besides, there are at present many hsien districts where even 3rd Class Post Offices have not been established. Since the postal service is a government enterprise, it must aim at giving all possible facilities to the public and therefore it is necessary to make strenuous efforts to increase the number of postal establishments in time.

(*c*) Development of P.O. Savings Bank.—The P.O. Savings Bank of our country was inaugurated in 1919. According to the statistics for 1927, the P.O. Savings Banks in the whole country total more than 300, depositors more than 50,000 and the amount of deposits more than $8,000,000.00. These remarkable records have been achieved in less than ten years since its inauguration. But, among the depositors, laborers and farmers are very few; the majority being officials, students and merchants. This shows that the general public are not fully familiar with the object and advantages of the P.O. Savings Bank. If efforts are made to propagate and extend this service, and, at the same time, if a uniform currency is fixed; if the procedure of "Through-deposit in the whole country," *i.e.*, not limiting the deposit and withdrawal of money to one particular place, is introduced according to the practice of various countries; then this service will have the best promise of rapid development.

(*d*) Bringing up technical postal men.

(*e*) Improvement of postal staff (high and subordinate classes) treatment.

(4) The total outlay to be incurred for reorganizing and expanding the enterprises as mentioned in Article 1, 2, and 3 amounts to no less than $100,000,000. This amount should be raised from time to time and with due allowance for deficiency. In raising the required capital, the first thing to do is to put in order the financial matters of the past as well as the present. Along with this come the re-organization of loans and the revision of loan agreements. The procedure is as follows :—

(I). DETERMINE THE FINANCIAL NEEDS OF THE ENTERPRISES TO BE REORGANIZED AND TO MEET THEM THROUGH THE FOLLOWING MEANS :—

(*a*) Issue of short-term loans.
(*b*) To float public loans for the reorganization of railway and telegraph enterprises.
(*c*) To prohibit the appropriation of both railway and telegraph earnings for other purchases. The said earnings after deducting maintenance charges for the two enterprises, should be used entirely to meet the urgent needs of such enterprises. The payments of both principal and interest of matured indebtedness should also be postponed, say for two years through arrangements with creditors concerned.

(II). TO PUT INTO EFFECT SPECIAL ACCOUNTING SYSTEM.—Special accounting system should be enforced so as to guard against misappropriation of funds of the enterprises conducted by the Ministry of Communications. This comes directly from the impossibility of relying upon the public treasury for financial help, and so, the enterprises must take care of themselves, without the special accounting system, earnings of the different enterprises will be mixed up with other government revenues and are most liable to be encroached upon by outsiders, thus leaving no funds for reorganizing and expanding the enterprise and for meeting the obligations of indebtedness. For this reason it is earnestly suggested that revenues from the enterprises should be singled out from other government revenues and be kept in the custody of a separate treasurer. To attain this aim, effective means are to be introduced :

(a) Codification of special accounting rules and regulations.
(*b*) Establishment of a centralized treasury for the safe-keeping and custody of funds for and from the different enterprises.
(*c*) Strict supervision as to budget-making and final statements of both receipts and expenditures.
(*d*) Guarantee as to the proper use of funds for the intended purposes and bring to a stop any misuse or misappropriation.
(*e*) Abolishment of rendering services on account.

(III). REORGANIZATION OF OUTSTANDING INDEBTEDNESS AND REVISION OF LOAN AGREEMENTS.—According to statistical figures, domestic and foreign loans of the different enterprises climbed, in 1914, to a total of $700,000,000. We must remember that in recent years the domestic loans have been in default and also oftentimes, it has been unable to discharge foreign obligations when due, to the impairment of our credit. In order to amend this situation, a reorganization plan is laid out, containing four processes as given below :—

(*a*) Various advances and loans aggregating $110,000,000 as contracted and taken care of by the Ministry of Finance should be left to the said Ministry for their liquidation.
(*b*) As to other railway and telegraph loans, domestic and foreign, secured upon either properties or earnings or both, the arrangement of postponing the principal and interest payments should be solicited for from creditors concerned with the understanding that such payments will be made until after the different enterprises under reorganization are put on their feet again and in good order.
(*c*) All the remaining loans are to be classified according to their nature and to be treated accordingly.
(*d*) Loans agreements should be made reasonable and on an equal basis. Those impairing our sovereign rights, or aiming at monopolistic control and unreasonable profits, should be revised as soon as possible.

(B) IMPROVEMENT AND ENLARGEMENT OF ENTERPRISES URGENTLY REQUIRED.

I.—Section from Chuchow to Shao-kown on the Canton-Hankow Railway to be completed. Approximately $60,000,000 will be required.

II.—Section from Chien-tang-kiang to Tsao-o on the Shanghai-Hangchow-Ningpo Railway to be completed. Approximately $10,000,000 will be required.

III.—Section from Ling-pao to Lanchow on the Lunghai Railway to be extended. Approximately $90,000,000 will be required.

IV.—Reconstruction of Kwankow section on the Peping-Suei-yuen Railway (No estimate is made as surveying is still incompleted.)

V.—To regulate the national wireless stations and their construction, as follows :—

1. Construction of 78 wireless stations throughout the country divided into four divisions, 25 stations for south-eastern, 28 for north-eastern and 12 for north-west and 11 for south-western divisions respectively.
2. Construction of international wireless station at Shanghai for direct communication with European and American countries, to be completed within two years.
3. Construction of broadcasting stations at the Capital, Shanghai, each provincial capital and large seaports and important cities. (For particulars refer to Appendix No. 2.)
4. Proposed plan for the Government Radio Manufacturing works (Appendix No. 3.)

VI.—Proposed plan for locomotive and car works. (See appendix No. 4.)

VII.—Plan for the establishment of Government aerial service.
1. Construction of international aviation field.
2. Domestic aviation lines. (For particulars see Appendix No. 5.)

VIII.—The taking over of navigation administration by this Ministry through :—
1. Co-operating with Ministries of Foreign Affairs and Finance for minute discussion and arrangement.
2. Drawing up of various navigation rules and regulations.
3. Collect and keep navigation experts.

The above eight items being all urgently needed for immediate action will require about $200,000,000.

(C) PLANNING OF FUTURE ENTERPRISES.

1.—To regulate the principles on railroads throughout the country, for periodical surveying and construction.

1. Two kinds :—main and branch lines, each main and branch line divided into first and second classes as follows :

(*a*) First class mainline—
1. Direct to sea or large seaport or connected with international railroads.
2. Over 1,000 kilometers in length.
3. Passing through important capitals or cities.

(*b*) Second class main line—
1. Direct to seaport or connected with main lines.
2. Over 500 kilometers in length.
3. Passing through provincial capitals or large cities.

(*c*) First class branch line—
1. Connected with main lines or direct to seaports.
2. Over 200 kilometers in length.
3. Passing through prosperous places.

(*d*) Second class branch line—
1. Passing through distinguished places.
2. Over 200 kilometers in length. (For further particulars see Appendix No. 6).

2.—Allocation of periodical survey and construction. Estimated to be completed within fifty years, divided into ten periods of five years each. (For particulars see Appendix No. 6).

II.—To regulate the national highway, its periodical survey and construction.

1.—Classification and scope of design.
(*a*) National highway.
(*b*) Provincial highway.
(*c*) City highway.

2.—Classification of highways—
(*a*) Main lines.
(*b*) Branch lines.

3.—Routes of highways and their distances.
4.—Method of periodical construction.

Estimated to be completed in ten years divided into three years of each of the first two periods with last period of four years.

5.—Standard of budget and method of preparation.

Estimated to require about $138,750,000 according to budget with an average of $3,000 for each kilometer as per automobile highway already completed. The amount to be borne by the government for floating of highway bonds.

(For particulars see Appendix No. 7).

III.—Proposed plan for the establishment of iron and steel works. (For particulars see Appendix No. 8).

IV.—Plan for the adjustment of Yangtse-Kiang waterways. Aims :—

1. To promote navigation.
2. To prevent flood.

(For particulars see Appendix No. 9).

V.—Extension and encouragement of ocean navigation.

1.—Establishment of South Sea route, China and Japan.

America and Europe routes according to state of financial standing and importance of requirement.

2.—Award and protection of ocean navigation.

(*a*) To draw up ocean commercial laws.
(*b*) Regulations governing navigation awards.
(*c*) Introduction of marine insurance.

3.—Plan for large ship-building yard and extension of existing yards (For particulars see Appendix No. 10).

III.—CONCLUSION.

In carrying out step by step the adjustments and expansion of the enterprises of communications as outlined above, four points will be worthy of consideration, firstly,—Centralization of authority —To create co-operation free from any outside influence as to traffic, finance and staff, etc., giving the central authority not only in name but also actual power of administration.

Secondly.—Independence of accounting. It is earnestly hoped that from now on the government will refrain from the shifting of communication income and local governors stop from drawing so that a special accounting system working for financial independence may be actually carried out.

Thirdly.—Cancellation or reduction of heavy taxes. Owing to the recent numerous forms of taxes and various taxation bureaux in each province one freight car would have to be taxed several times before allowed to proceed to its destination that the merchants either change their routing or postpone shipments thus affecting directly the revenue of railroad and indirectly the tax receipts of government, that a total abolition or reduction would not only facilitate transportation of goods but also increase tax receipts to the benefit of both the merchant and government.

Fourthly.—Suppression of banditry. That all provincial military commanders and local governors to be held responsible with the co-operation of police to insure public peace and safety of traveling so as to eliminate such outrages like destruction of track or robbery on trains, cutting of telegraph poles or wires, ransacking of mails and pirating ships.

Inasmuch as co-operation of all is needed with union as well as division of labor required more than the sole effort of this Ministry, this proposal is hereby respectfully submitted to the government for approval and to be carried out.

(1).—Proposed Plan for the Development of the National Long-distance Telephone Service and its Estimated Cost.

The long-distance telephone service in China has not gone far in its development, although its need has long been felt throughout the country. This plan is mapped out in a very systematic way, and, if systematically carried out, will serve to meet this need well. The most important items in the plan are (1) the laying out of routes (2) the utilization of telegraph poles and (3) the investigation and repairing of telegraph poles.

The entire cost, in the case of the plan being fully carried out, is estimated at $10,100,000 approximately.

(2).—Proposed Plan for the Establishment of the National Radio Communication System.

Owing to the extensive area of the Chinese Republic, the plan starts with the division of the whole country into four districts and then goes on with the particular work according to the particular nature of each district. The number of stations to be built, according to the plan, is seventy-seven throughout the whole country, excluding six short-wave radio stations for international use.

(3).—Proposed Plan for the Government Radio Manufacturing Works.

This plan lays stress on the manufacturing of broadcasting sets, short-wave transmitting and receiving sets, and other radio supplies for the Government Radio Stations. The installation and running expenses of the undertaking are mixed at $150,000 and $1,000,000 respectively.

(4).—Proposed Plan for Locomotive and Car Works.

The Railway Statistics of 1915 gives the figure of 1,140 locomotives, 2,169 passenger cars and 17,524 freight cars owned by the Government. According to this figure the Government, in order to ensure efficient service, ought to build sixty locomotives, 150 passenger cars and 1,300 freight cars to take the place of those worn out in use each year. This plan has been worked out to meet this demand.

(5).—Proposed Plan for Establishment of the Government Aerial Service.

The plan consists of two main items, namely, the establishment of international aerial stations along China's sea coast and the establishment of domestic aerial stations along its principal trade routes. The routes in question are as follows :

1. Mukden-Canton Line.
2. Peiping-Canton Line.
3. Shanghai-Chengtu Line.
4. Tsingtao-Suchow Line.
5. Antung-Urga Line.

(6).—General Scheme for the National Railway Systems.

This scheme has been outlined mainly on the basis of the principles laid down by Dr. Sun Yat-sen and partly on the results of the investigations made by many of the experienced railway engineers. It consists of three main parts as follows :

1. Outline of the scheme.
2. Plan for periodic construction.
3. Description of routes and the approximate estimate of the cost of construction and equipment.

(7).—Proposed Plan for the Construction of the National Highways.

The city of Lanchow, owing to its appropriate locality, is taken as the center for the construction of the National Highways which, according to the plan, are classified into two kinds, one taking Lanchow as center runs in a circular way around the city, while the other passing through Lanchow goes in a straight line.

(8).—Proposed Plan for Iron and Steel Works.

This plan is outlined under four headings as follows :

1. Approximately estimate of productive capacity.
2. General description of works.
3. Appropriate location of works.
4. Approximate estimate of cost.

(9).—General Plan for the Improvement of Yangtse River Waterways.

The main work as described in this plan is to be taken up by two steps in two different periods, namely, the surveying period and the engineering period. In the former the principal part of the work is the surveying of the different sections of the river, while in the latter the constructive engineering work takes place.

(10).—Proposed Plan for the Government Shipbuilding Works.

This plan gives full particulars for the installation of new shipbuilding works in the ports of Canton and Hankow, while in Shanghai, Foochow and Taku projects are also made for the improvement and expansion of the works now in existence. The approximate cost for the carrying out of this plan is estimated at $15,000,000.

Recent S. M. R. Development Work

THE visitor to South Manchuria, and particularly to Dairen in the Kwantung Leased Territory, is struck by the paternal organization of the South Manchuria Railway, a concern in which the Japanese government holds one-half of the stock. It has constructed, besides the existing roadway of the South Manchuria Railway which extends 438 miles from Dairen to Changchun, the electric light, traction and power works in the Leased Territory, a great general hospital built in Dairen by the American concern of George Fuller Company at a cost of Y.4,500,000 and a wharf at Dairen considered to have the largest loading facilities of any in the Far East. It maintains a Central Laboratory investigating methods of further employment of the economic resources of Manchuria, and several agricultural experiment stations assisting the development of still more valuable crops. It operates the Fushun Collieries at Fushun, and the Anshan Iron Works, and controls the administration of the railway zone, including the provision of educational and welfare institutions.

This civilizing force, as Mr. Henry W. Kinney speaks of it in his recently revised book on "Modern Manchuria and the South Manchuria Railway Company," has in process of building or has recently completed several important construction works. Mr. Kingo Kaise, chief of the Technical Advisory Board of the South Manchuria Railway Company and president of the Engineers' Association of Manchuria, points out certain of these of special interest.

Of these he mentions a coal pier, now being built at Kan-sei-shi, opposite the port of Dairen, which will have a daily loading capacity of 10,000 tons, or over three million tons a year. A breakwater which will protect this pier has been partly completed, and the pier itself is under construction. The mechanical equipment, it is learned from Mr. Kaise, has not yet been purchased, but it is expected that the entire work will be completed and machinery installed and ready for operation by the Spring of 1931.

A second development plan which the South Manchuria Railway has recently completed and now has in progress is the enlargement of the open cut coal mining operations at Fushun. It is expected that the mines, which are 270 miles from Dairen and served by a double track, will be able to take a larger place in the supply of fuel in the Far East, and it is chiefly with this idea in mind that the administration is increasing loading facilities at Dairen.

Mr. Kingo Kaise, Chief of the Technical Advisory Board of the South Manchuria Railway and President of the Engineers' Association of Manchuria.

The seams at Fushun are overlaid by oil shale, and the extent of coal mining there has brought up a problem not only of refilling the open pits, from which a number of underground 'penetrations have been made through the assistance of pillar supports, but the disposal of this oil shale. The latter, since the earliest operations, have been a source of danger because of the ease and frequency of ignition.

The engineers there have for a number of years been employing the safety device of covering shale with a layer of earth. Fire has, however, been found in shale under a cover of as much as ten feet or more. The fire danger, the need for filling material for pits which have been worked out, and the value of oil have led the Company's Technical Advisory Board to consider and to put into process of realization a plan to extract the oil content for the market and provide a waste product of value in its mining operations.

Mr. Makino, at present charged with a project for the extraction of shale oil, provides figures showing that when plant at present being built has been completed, which is expected to be in September, 1929, the company will be producing 50,000 tons of fuel oil a year, and in addition be securing as bye-products 5,000 tons of coke, 7,000 tons of parafine, and 18,000 tons of sulphate of ammonia. It is considered that it will eventually be feasible to extract oil to the amount of 4,000 tons a day, and bye-products in proportionate amounts.

The oil shale secured at the Fushun Collieries is a brownish black rock from which it is estimated liquid fuel can be extracted to a total of five thousand million tons. The heat value is believed to average 1,400 calories, and on this basis the heat contained in the shale is equivalent to eleven hundred million tons of coal, greater than the coal of the colliery.

Tests made by the Central Laboratory of the South Manchuria Railway, together with surveys, give the following information:

The thickness of the oil shale strata is 450 feet vertically from the surface, and the real thickness, which runs at right angle to the surface, is 39 feet on the average. The same stratum has an almost equal quality at different points on the same level, but the quality of strata differs considerably at various depths. The upper stratum is the richest, and the lowest, that directly above the coal seam, is the poorest. There are three rich points between.

The standard oil yield (the commercial yield by the Scotch method of distillation estimated by laboratory distillation analyses, averages 5.6 per cent. The highest is 14 per cent. and the lowest 1 per cent. The oil yield will be 7 or 8 per cent. if the poor strata, directly above the coal seam and others, are not worked. It is practicable to collect shales of 10 per cent. oil yield.

The total amount of oil to be extracted from the shale within the area of the chief open cut is estimated as follows:

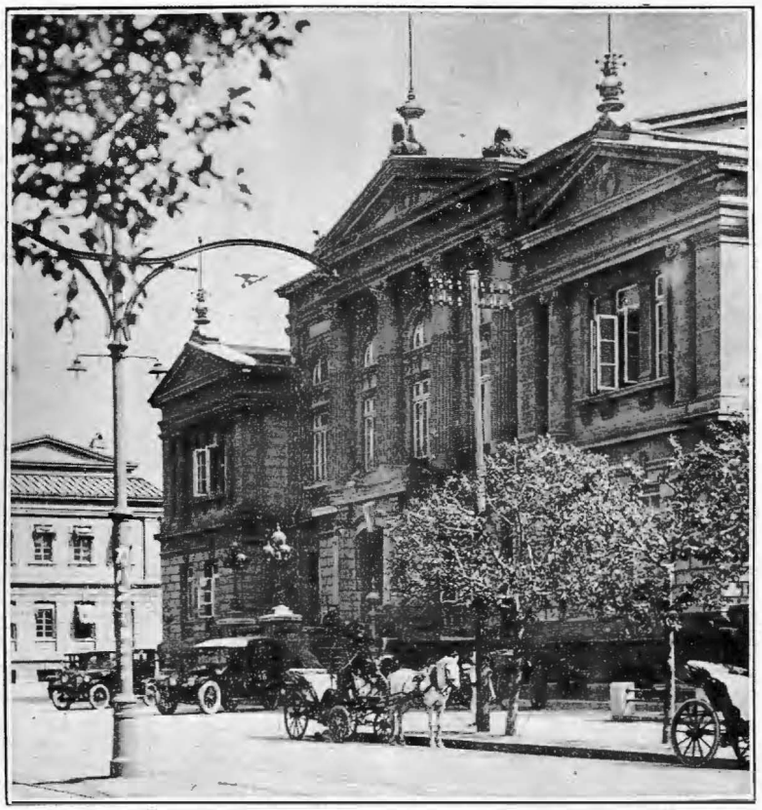
If the whole strata is to be treated, the amount of oil obtainable is 53,000,000 tons times 5.6 per cent. (the average oil yield), or 29,680,000 tons. If only the shale of above 8 per cent. oil yield is treated, the amount of oil obtainable is 53,000,000 tons times 20 per cent. times 10 (the average oil yield), or 10,600,000 tons.

A report by the Central Laboratory some time ago said: "The oil shale only within the area of the great open cut can supply at least 2.5 times the amount the crude oil produced from all of the wells in Japan proper during the next thirty years, and the whole shale strata within the boundary of the Fushun Colliery a similar amount for three hundred years."

The South Manchuria Company has under construction at Mukden a hotel building which when completed will be added to the chain of Yamato hotels, named after a Japanese tribe or clan, which have been constructed at Dairen, Star Beach near Dairen, Port Arthur, Seoul, Korea, and at some other points in parts of the mainland where the Japanese have special interests. These hotels are now being operated by a private holding company organized in January of this year. This separation of going subsidiary concerns from the parent company is in line with a policy which the S. M. R. plans to follow in the future.

A hospital, according to Mr. Kaise, has just been completed at the Fushun Colleries at a cost of Y.500,000 to serve the Chinese

A Library is One of the Many Educational Institutions Which the S. M. R. Has Established in Dairen or in Towns Along Its Railway Zone.



The Administration Building of the South Manchuria Railway Company at Dairen.

labor employed by the company there, and a gereral hospital, which will cost Y.1,500,000, is now being constructed at Fushun. The latter is expected to be finished during the present year.

Mr. Kaise also mentions an important and expensive work which the administration has under way in the double tracking of the line from Dairen to Changchun, a distance of 700 kilometers. of this, approximately 500 kilometers have been completed and put into service. This has been an expensive improvement in line which the company has been carrying on already over a period of nearly twenty years. The section from Dairen to the Fushun Collieries was completed rapidly, while the track beyond, serving chiefly an agricultural community, has been allowed a longer time.

One of the parential works of the railway administration, operating through the city government, is the building of an athletic stadium in Dairen for the use of the students of all schools in the city. This stadium, which is of re-enforced concrete and in bowl form, will be completed during the next few weeks and is expected to be available for football and other games during the coming fall.

Mr. Takebe, chief of the Commercial and Industrial Department of the railway administration, is particularly interested in what so far is only a project to prepare in Manchuria soda ash, a chemical especially needed by the Japanese domestic market as a fundamental material in several industries. Japan, according to Mr. Takebe, is at present using 120,000 tons a year, and the demand is steadily increasing. Of this amount, a plant at Makiyama, operated by the Mitsubishi company, is producing 20,000 tons, while nearly all of that imported is supplied by Great Britain.

The chief basis is salt, and it is estimated by Mr. Takebe's department that 300,000 tons of this are being extracted from the sea annually in Manchuria, and that there is the possibility of a much increased production of this easily secured material. Coal, also needed in the manufacturing process, is to be had cheaply in Manchuria.

A completed plan, for which His Excellency President Yamamoto of the S. M. R. has recently been in Tokyo to secure sanction for putting it into effect is to erect a plant at a cost of Y.5,500,000 which would manufacture 50,000 tons a year, or approximately half of the ash which Japan at present buys abroad. It is believed that it can be manufactured in Manchuria and sold in Japan for less than is at present being paid for imported ash.

While a site for the plant has not yet been selected, it is understood that one in the Kwantung Leased Territory is favored, and it is thought that the point of construction will probably be not far from the important salt fields of Pitsuwo.

In line with its policy of directing so far as possible the lines of development of the Kwantung Leased Territory and South Manchuria rather than controlling it, the railway administration will, in the event that the soda ash plant is constructed, invite participation in the enterprise by other capital. On this subject one of the company's directors, Mr. Kohiyama, says, according to a recent issue of the "Manchuria Daily News," "This question has long been studied, particularly by Doctor Nishikawa of the Kyushu Imperial University. As we are sure of the economic feasibility of the undertaking, we are prepared to start it. The railway is working jointly with the Kwantung government and home capital, but in the event that others withdraw, the railway administration is prepared to continue on its own account."

An Observation Car Is Part of the Equipment on S. M. R. Express Trains.

The Central Laboratory of the South Manchuria Railway

COMMENT of those acquainted with the large and manifold operations of the various departments and institutions of the South Manchuria Railway Company is that some of the most important work of the entire system so far as concerns planning for economic development is that being done by the administration's Central Laboratory, of which Dr. S. Sera is president and director general. This organization, the central office and head laboratories of which are in Dairen, has a branch at Anshan, where it is operated in connection with the Anshan Iron Works, and an affiliated laboratory at the Fushun Colliery at Fushun, 270 miles north of Dairen.

There are now under the direction of Dr. Sera five departments, these being under the titles of agricultural chemistry, mineral or inorganic chemistry, leather and tanning, organic chemistry, and fats and oils, the latter being concerned with new methods of treating these two most important items in the trade of the area served by the South Manchuria Railway's system.

The existence of these five sections is the result of a reorganization in April, 1927, of two departments which until then had been termed a chemical and a research laboratory. With an increased staff, now numbering sixty experts and approximately the same number of assistants, it is felt that a more specialized organization is better prepared for the demands made upon it.

A report on last year's work under the former organization shows that examination during that period was made in the chemical laboratory of a number of drugs and other pharmaceutical products, food stuffs and beverages, water, cement and pozzuolana, oils and fatty matter, minerals, and agricultural products. In the other department then existing, the research laboratory, studies, as contrasted with examinations, were made of the composition of Chinese medicinal plants; the soya bean and other staple products in Manchuria; the manufacture of alcohol from kaoliang or sorghum; the production of gasoline by dry distillation of oil shale and also by distillation of lime soap of soya bean oil; the improvement of tussah silk; the manufacture of metallic magnesium and its salts from Manchurian magnesite; Glauber salts and other chemicals secured as bye-products of the Manchurian salt fields; glue from animal bone; dolomitic and slag cement from dolomite and slag; starch from kaoliang and maize; pulp from kaoliang stalk; and various synthetic medicines and dyestuffs resulting as bye-products of coal distillation in the process of extracting oil with benzine or the hydrogenation of soya beans.

Publications were issued in Japanese, most of which are available at the present in that language, on sorghum alcohol, kaoliang pulp, the manufacture of potassium salts from kaoliang stalk ash, maize and kaoliang starch, beans and bean products, the medicinal herbs of Manchuria, salvarsan, permutite or water purifiers, magnesite and lignoid, pottery ware, fire brick, glass, and wild cocoons.

Dr. S. Sera, President and Director of the Central Laboratory of the South Manchuria Railway at Dairen

The superintendency of the five departments which have now succeeded to the former organization is distributed as follows: the department of agricultural chemistry, President S. Sera; mineral or inorganic chemistry, Dr. K. Nishida; leather and tanning, Mr. S. Ozawa; organic chemistry, Dr. M. Tanaka; oil and fats, Dr. M. Sato.

Most of the experts are graduates of Japanese universities and technical colleges, while some have received scientific training in America or Europe. Doctor Sera was graduated from the Imperial University in Tokyo in 1914 and spent several years in Germany, France and the United States. In New York he was associated with Doctor Takamine, a chemist of international reputation who made important contribution to the isolation of adrenalin.

For work at the present the department of agricultural chemistry has joined with that of oil and fats in concentrating on improving present products of or producing new products from soya beans, an article in Manchurian commerce considered of first importance not only to the railway but to the port of Dairen and to considerable commercial and manufacturing interests in Japan. One of the problems on which the laboratory is at present working is that of learning how to extract oil from beans so as to obtain the best kind of cake for human and animal food.

For extraction most of the so-called modern plants in the Far East are using benzine. The laboratory has employed alcohol, methyl-alcohol, petroleum benzine and other solvents. It is now of the opinion that best results are to be obtained from a benzine and alcohol mixture.

A View of One of the Many Departments of the South Manchuria Railway's Central Laboratory at Dairen

Although bean cake was formerly used almost entirely as a fertilizer, a condition which still prevails to a large extent, it seems probable that Manchuria will in the soya bean produce an article of importance in assisting to solve the Asiatic food problem, and possibly also that of the West. The latter already purchases a large amount of bean oil for food as well as for industrial uses. One of the products of the laboratory is a bean flour from which oil has been extracted which is white and fine in texture. The uncooked laboratory product has an odor which would seem objectionable, but Doctor Sera says that when this is mixed with wheat flour in proportions up to thirty per cent. highly edible bread and some pasteries can be obtained successfully, and that the bean flour adds a needed protein value to similar products made only of wheat. The odor, which at present is comparatively mild and not more evident than in some other household foods, the laboratory expects to eliminate entirely. Doctor Sera says that although he recognizes that it is not alone necessary to find a new food but to get people to employ it, he believes this bean flour may in time come to have a fairly general use.

Another item of value to the Japanese and Chinese domestic markets is the production in the laboratory of soy sauce, an article of general employment in these countries, from bean cake. This is already being produced economically and in merchandisable quantities. A saving is effected both in the ease of using this cake and in the value of the oil extracted before the residue is made into sauce.

The most important work of the department of inorganic chemistry, according to Doctor Sera, is the preparation of magnesium from magnesite, of which there are considerable deposits in various parts of Manchuria. It is especially widely distributed, according to the investigations which have so far been made, in South Manchuria. A very recent product of the laboratory is an artificial marble, made also from magnesite. With a view to possible commercial production of this latter a patent has been taken out in Japan to protect this process.

The department of organic chemistry has in hand at the present experimental work having to do with utilization of coal and its bye-products, especially gas and tar. Part of this program is the liquidation of coal into gasoline. This work is being done not at the Fushun Collieries but at Dairen. Investigation is also being made of processes for the so-called cracking of tar to produce gasoline. A section of this department is employed at the Anshan Iron Works in testing iron and steel and in making analyses of ore.

The department interested in leather and tanning is making experiments to discover the advisability of attempting to introduce into Manchuria in a practicable way European and American curing and tanning methods. If it were thought that an economic gain would result, the laboratory would be prepared to establish demonstration stations in various hide and skin centers in districts served by the railway to teach producers how to cure, and make it useful for the farmers to use these new methods by establishing a favored purchasing system. If this is not thought advisable, it is possible that the company will construct a depôt and tannery at some central location, possibly Dairen, and do the curing itself. The experiments of this recently started department have as yet not brought sufficiently definite results to permit recommendations.

Mr. J. Furusawa, managing director of the Nisshin Oil Mills for the extraction of oil from soya beans, is one of the leading non-official members of the Japanese community in Dairen and the Kwantung Leased Territory. He pays a tribute to the work of the Central Laboratory of the South Manchuria Railway, which is carrying on experimental work in the employment of new methods for the extraction of oil.

At the present the mills in the Kwantung Leased Territory, of which there are eighty-nine, and approximately four hundred in Manchuria, employ either native pressing methods or, in the case of modern plants, a process of extraction by benzine similar to that used by plants in Japan.

In the Oil and Fats department of the Central Laboratory experiments have recently been made in the employment not only of benzine but of alcohol, methyl-alcohol, petroleum benzine and other solvents. The most successful is considered to be a mixture of alcohol and benzine. It has not yet, however, been demonstrated that the saving would be sufficient to warrant a change in extraction method by mills already using the benzine process alone.

Correspondence

Chapei Waterworks

To the Editor,

THE FAR EASTERN REVIEW.

Dear Sir,

With reference to your description of the New Plant of the Chapei Waterworks near Woosung we shall be obliged if you will please correct a few inaccuracies contained therein.

The present capacity of the Waterworks is 10 Million Gallons in 24 hours with provision for an unlimited capacity in the future.

The Water Tower built in the shape of a pagoda contains two Reservoirs. The upper one of a capacity of 50,000 gallons serves as a reservoir for the necessary water for drinking purposes and the hydrants of the New Plant and the surrounding country while the lower tank of a capacity of 120,000 gallons contains the wash water for the Rapid Filters. This Tower is independent of the main feed pipe to Chapei because the water is pumped from Woosung directly into the Water Tower in Chapei, eight miles distant. The accompanying Photo shows the Water Tower completed.

The Chapei Waterworks.

The Works are in operation since the beginning of June and the water is found to be of very good quality.

Yours very truly,

C. LUTHY.

second boom point sheave and from there down to the shipper shaft drum where it is wrapped and anchored. A second and independent wire rope is carried from the pull back drum on the main drum shaft to the shipper shaft drum where it, too, is wrapped and anchored. The ropes are wound on the shipper shaft drum in such direction that the pull on the hoisting rope will turn the whipper shaft and crowd the handle out. This motion may be prevented by setting the brake on the pull back drum or may be reversed by throwing in the pull back drum clutch friction. This type of crowd is very simple and easily controlled. It is automatic in action and has great crowding power, due to the multiplying action of the differential drum mounted on the shipper shaft. No slack ever occurs in the cables, consequently they need no attention.

The hoisting and crowding are perfectly timed and co-ordinated, making it easy to cut to any grade desired. The use of two drums make it unnecessary to add to the machinery when shovel is converted to clamshell or dragline.

The Conqueror is mounted upon a truck that is absolutely the last word and is the result of years of experience in designing truck frames. It is very heavy and rugged, exceedingly simple in construction, easy to control and maintain in operation. It has a travel speed of approximately seven-tenths miles per hour and will negotiate grade up to and in excess of thirty per cent. The Conqueror truck is designed to give the upper body a suitable mounting for travel over all kinds of material, ranging from rock to mud, and at the same time furnish sufficient locomotive power to enable it to move readily from one point to another.

The Continuous Tread Truck is of the double chain drive type and is built up entirely of steel castings, with axles and cross travel shaft of hammered steel. The truck frame is a single massive steel casting. The roller path gear is of cast steel with cut teeth of the outside type, and is securely riveted into place on the truck frame casting, and has a machined shoulder to more securely hold it in place. The side frames are large unit castings and are of box section, bow type construction. Five travel rollers 14-in. in diameter are mounted within each side frame. These rollers operate on stationary shafts and are lubricated by recessed high pressure gun fittings.

An idler tumbler 25-in. in diameter is mounted in one end of each side frame casting, while in the opposite end the driving tumbler is mounted. Both tumblers are on stationary shafts with screw adjustments in tension. This arrangement makes it possible to adjust the tension of the tread belt from one end and the tension of the driving chain from the other end. The tread links are of improved type, one piece and overlapping, and of very strong, heavily ribbed construction. These links are pin connected by large steel pins in quadruple shear and are unlubricated. They are of the " full floating " type so that wear is distributed evenly about the pin, and making it easy to remove the pin when desired.

Power is transmitted from the vertical travel shaft to a single, one piece cross propelling shaft held in three heavy bearings. The cross travel shaft is of $4\frac{1}{2}$-in. squared section and no keys are used in its construction. There is mounted on this shaft one bevel gear, two jaw type clutches and two bronzed bushed driving sprockets. Power is transmitted from the driving sprocket to driven sprocket on the driving tumbler by means of very heavy roller chains. There is one very heavy roller chain on each side delivering power direct to the tread belt driving tumbler.

The truck is steered by means of bell crank and levers controlled from the cab at the operator's position, irrespective of the position of the upper body or of the truck frame and without making connections of any sort. Automatic locking pawls hold the machine in any digging position and can be so controlled that movements will be prevented in one direction and be perfectly free in the opposite direction. Direction of moving for digging operations can be controlled as desired. The truck is bronze bushed throughout and is also lubricated by high pressure gun fittings that are so located that it is not necessary to get under for greasing. Every fitting is located in an accessible place.

The driving clutches can be easily disengaged for towing purposes.

The Conqueror has ample deck space all around the machinery and the motor. The control levers are all banked to the left front side of the machine where the operator has a full view of his work at all times and has complete control of his machine without leaving his seat.

[illegible] controls, including oil pressure gauge, are banked on [illegible] board within view and reach of the operator. The house or cab is all of steel construction, fully enclosed, and is provided with large door openings, and a window in the rear for light and ventilation. Electric dome and flood lights provide illumination from the storage battery for night operation.

The Conqueror is painted a rich olive green color.

The Conqueror will be found an economical machine to use in various types of service, and with various attachments, from lightest to the heaviest kind of work. The Conqueror has the correct balance and proportion in design to give it the right amount of speed and power, combined with sufficient back-bone to enable it to function over long periods of time under rather adverse operating conditions.

It is a tested machine, and its operation, maintenance, and repair will be pleasing to any owner or operator.

Damage to the Tientsin-Pukow Railway

According to investigations made by the railway authorities, the material damage done to the Tientsin-Pukow Railway as a result of military operations during the Northern Expedition is estimated at $18,621,663.00. Eighty-three locomotives, 315 passenger cars, and 1,058 trucks were either destroyed or seriously damaged.

A detailed account published by the Tientsin-Pukow Railway Administration gives the loss as follows:

	$
Damage to rails	158,737.46
Damage to bridges and tunnels	151,539.42
Damage to railway stations	97,274.01
Damage to railway godowns	60,525.00
Damage to railway offices	6,000.00
Damage to employees' residences	37,023.22
Damage to locomotives	6,640.000.00
Damage to passenger cars	6,595,000.00
Damage to trucks	4,220,000.00
Damage to telegraph and telephone lines	25,933.00
Damage to water towers	285.00
Damage to steam launches and junks	75,000.00
Damage to wharves	20,138.00
Damage to railway material	300,660.00
Miscellaneous damage	69,902.00

Of all the Government railways affected by the late civil war, the loss suffered by the Tientsin-Pukow Railway is the greatest because of the heavy and prolonged fighting between the Nationalist and Sun Chuan-fang's troops within the area served by this Railway. —*Kuo Min News Agency.*

Book Notes

"The Elesco Superheater for Power Plants" is written in the light of engineering efforts toward increasing fuel economy in America and abroad. Every phase of superheat is discussed; also the requirements for proper superheater design and how they are carried out in the Elesco design. Practically every make and type of boiler with an Elesco superheater is illustrated and explained.

In the first part are the introductory remarks giving brief statements about the Superheated Company and its activities in the power-plant field. The part played by superheated steam, basic definitions, and briefly the advantages gained through the use of superheated steam, are also given. The next section, "Application of the Elesco Superheater," gives general descriptions or specifications for the 67 superheater and boiler arrangements illustrated.

Convenient guides to the text and superheater and boiler illustrations are given in the front of the book. An industrial superheater information sheet will be found at the back.

Engineering Notes

New Harbor Facilities.—It has been proposed to extend harbor facilities at Newchwang, to afford an outlet for freight transported over the new Chinese lines in Manchuria. A plan is being drawn up to build wharves to berth vessels of various sizes and to construct a new town for railway freight dealers. It is also planned to open an exchange, banks, and trading establishments near the North Side Station. The sum of £50,000 has been appropriated for the immediate improvement of the port. A new bund is to be built along the shore front about two-thirds of a mile in length. All construction work is to be undertaken by the Peking-Mukden Railway.

Road-making by Soldiers in Chekiang.—Chekiang province is now considering the use of 50,000 disbanded soldiers for the construction of roads leading to Anhwei, Fukien, Kiangsu and Kiangsi provinces. As a result of repeated requests from the Nationalist Government, the provincial authorities have decided to build, first, the road from Hangchow to Hweichow, Anhwei province, at the same time sending soldiers to work on the five provincial roads. It is estimated that the materials for the road from Hangchow to Liangchu will cost $89,804.72. Plans adopted by the provincial authorities will be sent to the Central Government for approval. The Central Government is requested to pay the living expenses of the soldiers as the provincial government is not able to provide funds.

Provincial Road Building.—Reports from Nanchang state that the provincial finance department of Kiangsi has decided to appropriate $100,000 per month beginning from August for the construction of six main highways in the province: (1) the Kiangsi-Chekiang highway, (2) the Kiangsi-Kwangtung highway, (3) the Kiangsi-Hunan highway, (4) the Kiangsi-Hupeh highway, (5) the Kiangsi-Anhwei highway and (6) the Kiangsi-Fukien highway. The reconstruction department of the Anhwei provincial government has also decided to repair and complete the following four trunk roadways in the province: the Wuhu-Tunki, the Anking-Szechow, the Anking-Ningkwo, and the Shucheng-Pochow Highways. It is estimated that the total mileage of the four trunk roads will be 2,590 *li* (860 miles). The programme set out by the highway department of the Chekiang provincial government calls for the construction of the Hangchow-Changhwa and the Hangchow-Hweichow highways. The roads connecting Shaohing and Ningpo, and Ningpo and Fenghua are now under construction and will be completed in the autumn. Various motor roads are also being constructed in and around Hangchow.

Road-Building in Hunan—For construction of modern highways, Hunan province has been divided into three sections: Central Hunan, Western Hunan, and Southern Hunan, for each of which a Highway Construction Bureau has been organized. Up to the present the Bureau for Central Hunan has achieved most notable results. In 1925 the first section of the provincial highway, from Changsha to Siangtan was completed, and in 1927 the road was extended to Siangsiang. Quite recently the section between Siangsiang and Paoking was completed and opened to motor traffic after an impressive inauguration ceremony held under the auspices of the local officials. Construction is being continued on two new roads: (1) from Paoking to Hungkiang and (2) from Paoking to Yiyang. The roads already constructed in the Central Hunan Section cover a total of 480 *li* or 160 miles.

In Southern Hunan section only the Hengyang-Leiyang Road, about 120 *li* long, has been constructed and in Western Hunan section little has been done owing to lack of funds and other causes. In the former section construction is suspended owing to the activities of the communists. Hunan authorities are starting a "country cleaning" campaign to eliminate the lawless elements, and, at the same time, are taking measures to induce the local inhabitants to co-operate with officials in road-building.

Transportation in Hunan Province.—During the last few years Hunan has paid great attention to transportation, especially motor traffic. Among the motor roads finished are the 90 *li* Chang-Tan road, from Changsha to Siangtan, the 360 *li* Heng-Chen road from Hengchow to Chenchow, the 90 *li* Tan-Siang road from Siangtan to Siangsiang and the 100 *li* Yung-Pao road from Yung-fung to Paoking. The Yung-Pao road was finished last May.

Shanghai-Hankow Aerial Postal Service.—The Nationalist Ministry of Communications intends to appropriate $100,000 for the opening of an aerial postal service between Shanghai and Hankow. Hydroplanes will be used at first, and each trip will take eight hours.

Tsitsihar-Koshan Railway.—For the construction of the Tsitsihar-Koshan Railway, it is stated that $6,200,000 has been allocated by the Heilungkiang provincial authorities and that work will start immediately. The first section will be from Tsitsihar to Paichuan, which later will be extended to Koshan.

Commercial Air Line for Canton.—For the encouragement of commercial aerial transportation, the Chamber of Commerce in Canton has drafted proposals to be submitted to the Kwangtung provincial authorities for the purchase of five aeroplanes. The first two will be for four passengers, while later purchases will be for over 10 passengers. The capital to be subscribed is $200,000 in 10,000 shares of $20 each. The aeroplanes will begin flying over four routes in the province, but when the project has proved successful the field will be extended.

Highway for Hainan Island.—As the Kwangtung provincial authorities are now deeply interested in the exploration of the undeveloped wealth of the island of Kiungchow or Hainan, it is decided to construct a road of 2,000 *li* round the island, passing through Manyun, Aichow, Tanchow, Cheongkong and Limko. It will take four years to complete and the cost, estimated at more than $1,000,000, will be defrayed from license fees and a 20 per cent. surtax on motor cars. To prevent misappropriation, all the money will be collected by the Highway Bureau and deposited in the Bank of China at Haichow. Motor cars are now taxed as follows: $20 on each commercial motor car, $10 on each private car and $1 on each motorcycle.

Navigation of Taihu Lake.—Taihu Lake occupies an area of 3,600,000 *mow* and is bounded by Chekiang and Kiangsu provinces. Cities surrounding the lake are prosperous and thickly populated. As industries have developed during the last few years, transportation has improved. But navigation of the lake has never been seriously considered by either the provincial authorities or the business people. Consequent on primitive methods of navigation and the activities of pirates, travelling on the lake is dangerous. In 1922, prominent business men in Wusih, Kiangsu province, organized the Sih Hu Navigation Company, and bought two steamers which are plying between Wusih and Huchow, Chekiang, and are intended to take in Hangchow in the future. Unfortunately, owing to civil wars, the boats were either commandeered by the military or stopped running. Since its organization, the company has never done good business, and, as a result, it went bankrupt last year. The property of the company has been taken over by Yeh Yang-wu, who has now organized the Taihu Lake Navigation Company and who intends to employ experts to take charge of affairs. According to many, the failure of the former company, although partly due to bad business and civil war, was largely the result of bad management. The new company will start business when a permit is received from the Nationalist Government. At present the old lines of the former company will be followed, but, later, boats will run to Hangchow, passing Shwanglin and Kashing.

THE FAR EASTERN REVIEW
ENGINEERING
FINANCE
COMMERCE

MANCHURIA

By GEORGE BRONSON REA

BARON TANAKA ON CHINA

By GEORGE E. SOKOLSKY

BOYCOTTS AND POLITICS

SINO-JAPANESE RELATIONS

THE NEW GOVERNMENT OF CHINA

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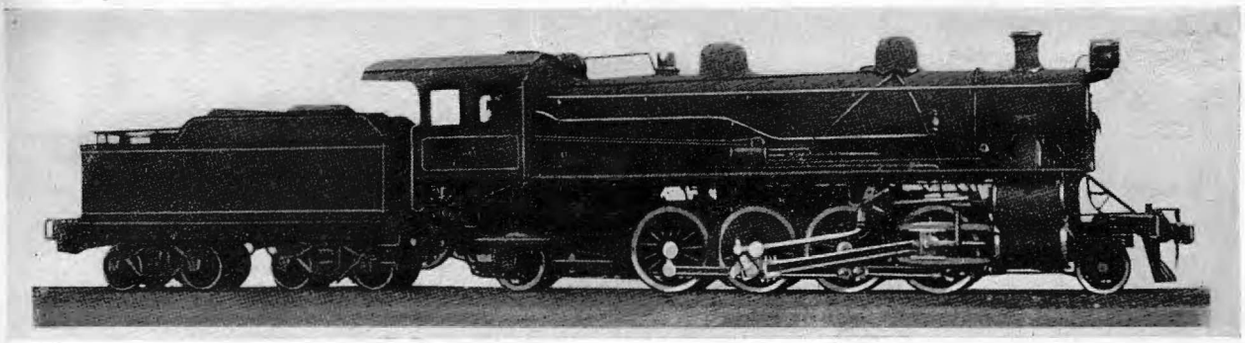

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It goes without saying that if the 1915 treaties are declared invalid by China, Japan's legal rights in Manchuria must be defined by the terms of the Portsmouth Peace Treaty. As the original lease to the Liaotung Peninsula expired in 1923, sovereignty over this territory would now rest with China. Without full jurisdiction and control over the deep water harbor and terminals of the railway, its further operation by the Japanese would be unprofitable and its control would have to be surrendered with the lease.

If China's contention holds good in regard to the 1915 treaty, there is nothing for Japan to do but accept an appraisal of the South Manchuria Railway and permit China to raise a foreign loan with which to purchase the properties. Japan would then be compelled to quietly fold up her tents and withdraw from the mainland of Asia. Or, if the 1915 treaty is invalid, Japan is forced back upon the Treaty of Portsmouth to defend her position and, in view of China's confession at Washington it would seem that Japan has a legal right to demand a reopening of the whole question and exact from China the compensation she was justly entitled to but buncoed out of at Portsmouth. It is either one or the other. Japan's position may be morally weak when China stands on the invalidity of the treaties arising from the Twenty One Demands, but if we go behind that date, China has not a leg a stand upon, if Japan invokes the secret treaty of 1896 as a reason for her determination to remain in Manchuria. In presenting before an American audience what I consider to be a common-sense interpretation of the Manchurian problem, you may ask what interest I have in taking this viewpoint. Ever since the text of the secret Sino-Russian treaty of alliance came into my hands at the Paris Peace Conference, I realized that this was the missing link, the key to the Chinese puzzle, the one document which explained and clarified all the subsequent moves on the Asiatic chessboard. With a deep insight into the problems confronting Japan in working out her destiny along peaceful lines, I have seen how the march of events would again create a situation where all the good-will and peaceful intentions in the world would not avert a crisis in the Far East. Japan cannot escape a showdown as long as China and Russia adhere to their present programs. Japan has fought two wars over Manchuria. She may be compelled to fight a third. She may be right or she may be wrong, but right or wrong, the world is entitled to hear and weigh the evidence on both sides of the case. I am interested in this problem from a purely American standpoint, for if another war is fought in the Far East, the United States will again become the battle ground for the propagandists of both sides. A determined attempt will be made to align us on the side of China, even to the extent of fighting her battles. It has been tried once. It will be tried again. In my opinion, the United States is not concerned as to which nation rules Manchuria. The problems there are not of our making. They do not menace the peace or the security of our country. The issue is one between China, Japan and Russia; one that we will do well to keep out of, even as a peacemaker.

The peace of the Far East hinges on an amicable solution of the Manchurian problem. Japan will fight to defend her rights in that territory. These rights, acquired through great sacrifices, are vital to her continued existence as an independent nation. A crisis has been precipitated by the attitude of China and Japan is now taking the necessary steps to safeguard her position. In the welter of propaganda that will be injected into the controversy it is well that the American people should know all sides of the dispute.

In conclusion, the facts of history tell us that the railway the Chinese now glibly denounce as the instrument of Japan's imperialistic designs in Manchuria and Mongolia was constructed originally with Chinese consent in Chinese territory as the instrument for crushing the independence of Japan. That Japan is not a vassal of Russia to-day is no fault of China's. Japan paid for her rights to the South Manchuria Railway with the lives of over 200,000 of her Sons and bankrupted herself in the bargain, while the Chinese army maintained a discreet neutrality. Manchuria is watered by the blood of Japanese patriots. Their graves and battle-monuments dot the landscape from Port Arthur to Mukden; emblems of a great sacrifice the corrupt Manchu rulers of China forced upon Japan. These memorials are a constant reminder to Japan of China's weakness and duplicity. As they kneel or stand in reverent homage before these Holy Shrines, the Sons of Nippon give thanks to their heroic dead that the Flag of the Rising Sun still floates over their beloved Homeland. Had they failed, the Japanese of to-day, would be holding their own Day of National Mourning, ringed around with Russian bayonets and China herself would long ago have passed under the yoke of Moscow.

To understand the Japanese viewpoint it is essential that these truths be borne in mind.

American Interest in Manchuria

Harriman's Scheme to Compel Japan to Sell the South Manchuria Railway

An American Loan to the S.M.R.

By Geo. Bronson Rea

IT is difficult to understand the motives which guided the diplomacy of our State Department in Manchuria immediately after the expiration of the Russo-Japanese war, unless we read carefully the "Life of Willard Straight" By Herbert Croly and the "Biography of E. H. Harriman." These two men were responsible for the reversal of our traditionally friendly attitude towards Japan into one of suspicion, jealousy and dislike. Japan had staked her very existence on the plains of Manchuria. All she got at Portsmouth in compensation for her tremendous sacrifices, was the transfer to her control of the South Manchuria Railway and a short-term lease to the Liaotung Peninsula. The old broad-gauge Russian line had been torn up by the retreating armies, the bridges dynamited and the rolling stock carried north to Harbin. When the war ended, the railway was a temporary narrow-guage military line laid on the old sleepers with improvised wooden bridges over the rivers. In effect, all that Japan took over from Russia was a right-of-way. The South Manchuria Railway had to be rebuilt and re-equipped from the road-bed up.

Into this picture steps Mr. E. H. Harriman, the most daring railway manipulator this country has produced. Harriman was obsessed with the dream of creating a round-the-world transportation scheme under his own control. Pursuing this will-o-the-wisp, he reached an understanding in July, 1905, with Marquis Ito and Count Katsura, whereby he was to furnish the capital for the reconstruction of the South Manchuria Railway and the development of mines and industries in the railway zone. Japan was to retain a substantial interest in the line and exercise political control. On his return from Portsmouth, however, Baron Komura opposed the plan on the grounds that China's consent would have to be obtained and shortly afterwards a loan for the reconstruction of the line was obtained from Great Britain. But Harriman was not the type that took such a defeat laying down. To understand what followed, it is essential to read carefully the revelations in Willard Straight's biography. The disinterested student will become convinced after a perusal of the facts therein set forth, that our renewed championship of the doctrine we permitted Japan to defend alone, arose from a desire on the part of Secretary Knox to further the extravagant schemes of Harriman to gain control of the South Manchuria Railway.

Willard Straight was sent to Mukden as Consul General in order to advance Harriman's schemes. Straight had discussed with Harriman the possibility of American investments in Manchuria and had received a commission to submit to Harriman plans for the railway development of the province with American capital. The negotiations for a loan to China were the direct result of Straight's intimate association with the Manchurian authorities and of Harri-

man's interest in building or buying railway lines in Northeastern China as links in his grandiose project. In order to compel the Japanese to accept Harriman's terms to take over the South Manchuria line, Straight conceived the idea of negotiating the Chinchow-Aigun project in co-operation with British interests, in order to parallel the Japanese line and destroy its strategic and commercial value. Secretary Knox them used the Chinchow-Aigun concession to induce the other Powers to consent to the neutralization of all the Manchurian lines, hoping by this means to open the way for Harriman to attain his object. Practically all the opposition to this scheme came from Russia, who flatly rejected it and laid down the doctrine that China could build no railways within her own territory menacing Russia's strategic position on the Amur River. Although objecting to Knox's plan, Japan declared her willingness to participate in it with the other Powers.

Again thwarted in his plans, and recognizing that nothing could be done until Russia's consent was obtained, Harriman changed his tactics and tried to purchase the Chinese Eastern Railway from Russia as one means of bringing pressure upon the Japanese to sell the South Manchuria line. If this compulsion failed, the Chinchow-Agiun project was to serve the same purpose. In other words, Straight confesses that the Chinchow-Aigun concession was designed as a lever to compel Japan to sell the South Manchuria Railway to Harriman and, if this object could not be obtained, to build and use the completed line to destroy the commercial and strategic value of the Japanese line. These confessions reveal that the Manchurian policy of the American Government for several years subsequent to the termination of the Russo-Japanese War, was intimately related to Harriman's schemes. The whole force of our diplomacy, and publicity was concentrated upon depriving Japan of the fruits of her victory over Russia, in order that an American railway king could carry out an extravagant scheme, which, if it ever had succeeded, would sooner or later plunge the nation into hostilities.

So intimate was the connection between Harriman and Straight and so powerful the influence of the Railway King, that he goes so far as to state in his biography that he intended to have Straight appointed American Minister to Peking, but Straight declined to accept the honor because of his youth and inexperience.

These facts indicate how completely the American government had been misled over the real situation in Manchuria. For it goes without saying that had Gresham, Sherman, Hay, Knox, or any other high-minded American Secretary of State the slightest inkling of the terms of the secret treaty of alliance between China and Russia, their entire sympathy and support would have gone out to the nation which so whole-heartedly and without reservation accepted and subscribed to our Open Door Doctrine, and so heriocally staked its very existence in restoring China's sovereignty over a territory that she had fairly forfeited. Had the existence of the Li-Lobanoff secret treaty of alliance been known to Roosevelt, his high conceptions of honor and his well-known friendship for Japan would never have permitted him to take such a leading rôle in bringing about the Portsmouth Peace Conference, except to see that full justice was done to Japan.

Japan Builds and Equips an American Railway

Let us go back to the time when the Japanese rejected Harriman's proposal and raised a loan of £20,000,000 in London to reconstruct and equip the South Manchuria Railway. What did the Japanese do with this loan? They went first to the British manufacturers with their requirements for rails, bridges, locomotives, cars and other equipment, giving them the first chance at the business. Time was the essential element in the contract. The British manufacturers could not guarantee delivery within six or eight months, so the Japanese took their inquiries to the United States. Mr. James A. Farrell, then head of the United States Steel Products Corporation, quoted lower prices than the British, promised immediate delivery and booked the order for the rails, bridge material and other steel work. The American Locomotive Company secured the orders for the locomotives; the Pullman Company furnished the passenger cars; other car manufacturers got the freight car business, while our railway equipment and machinery manufacturers scooped up the rest of the business. *We got it all.* Our British friends, controlling the ocean tonnage at that time, naturally resented our reaping the profits from the proceeds of their own loan and promptly took steps to take them away from us by quoting such high freight rates that there was little left for the American manufacturer. Before the British knew what was going on, Mr. Farrell had chartered several steamers and organized his own steamship line. Every ton of American railway material and equipment that went to Manchuria was shipped on these steamers. The Japanese did for us what we have never been able to do for ourselves in the Orient. They built and equipped down to the last spike, an American railway that stands as the finest advertisement of our railway practice and engineering supremacy, anywhere outside the United States.

Let me tell you what this has meant to us in dollars and cents. Since the Japanese took over the South Manchuria Railway, they have purchased in the American market, materials of all kinds to the value of over $50,000,000. In addition to this, individual Japanese industrial and mining concerns in Manchuria have purchased American equipment to the value of a further $25,000,000, a total of approximately $75,000,000. We loaned them no money. They paid cash.

Do you know what this means? The entire system of Chinese Government railways built from the proceeds of foreign loans is valued at approximately $150,000,000. The countries furnishing the loans received in return about fifty per cent. of the total in orders for materials. In other words, the European nations who loaned the $150,000,000 to China for railway construction, profited to the extent of $75,000,000 in orders for materials. American manufacturers were not permitted to participate in this business. *We got nothing.*

Without our lending them a cent, the South Manchuria Railway Company and its allied Japanese industrial concerns, have purchased in the United States, railway and engineering materials to the same extent as though we had financed the entire system of loan-built Chinese Government railways! Yet all this time, while our manufacturers were excluded from sharing in the railway market of China Proper and were profitting from this splendid market in Manchuria, a group of financiers were intrigueing to influence our government to support a concession designed to compel Japan to sell out the South Manchuria Railway to Harriman.

An American Loan to the S.M.R.

An intelligent answer to the question as to whether an American financial house should make a loan to the South Manchuria Railway Company, can only be made when the legality of Japan's position in Manchuria is taken out of international politics. Here we once more face the crux of the present problem as to the validity or invalidity of the 1915 treaties.

The American Government recognizes the validity of these treaties. Secretary Bryan in his note of March 13, 1915, to Baron Chinda, the Japanese Ambassador at Washington, raised no question as to the legitimacy of the Demands concerning Shantung. Eastern Mongolia or Manchuria. He frankly recognized that territorial contiguity creates special relations between Japan and these districts. As a matter of fact, the American Government protested only against such clauses of the Twenty One Demands as infringed the principle of equal trade opportunity by granting to Japan a monopoly of furnishing arms and munitions to China and of developing the province of Fukien, etc. When Minister Reinsch requested the State Department for a more explicit definition of what constituted Japan's special rights in Manchuria, he was informed, in effect, that it meant recognition of her legal rights based on the treaties, concessions, contracts and other agreements formally entered into by the two governments of China and Japan.

That this includes American recognition of the validity and legitimacy of the 1915 treaties, is clearly shown from the fact that the American consul at Dairen is under the jurisdiction of our Embassy at Tokyo. As far then as the American Government is concerned, it recognizes the legal rights of the South Manchuria Railway under the terms of the 1915 treaties and can not interpose any objection to an American loan to that enterprise.

However, when the Peking Government protested against such a loan on the grounds that the 1915 treaty is invalid, a very clear cut issue was created in which our Government could not take sides without intervening in a question that did not concern us further than to see that our treaty and trade rights in Manchuria are respected. The attitude of the Chinese Delegation at the Washington Conference in reserving the right to bring up the question of Japan's status in Manchuria on all subsequent occasions;

the fact that the Chinese did formally notify Japan of the termination of the original Liaotung Lease on its expiration in 1923, and that they again raised the issue in order to prevent an American loan to the South Manchuria Railway, has created a very definite and acute issue which can only be solved by some amicable agreement between China and Japan. Under these circumstances, it would be unwise for an American financial house to furnish a loan to the Japanese railway company at this time, notwithstanding that such a loan would be entirely legitimate. As such a loan would have to receive the approval of our State Department, such consent could not be extended without involving our Government in the dispute. Until there is proof that Japan has violated the Nine Power Treaty signed at Washington, the American Government is not concerned in the dispute between China and Japan over Manchuria. The problems there do not concern us further than to see that our treaty rights are respected. We made no protest when Great Britain proclaimed a quasi-protectorate over Tibet, nor did we take any action when Soviet Russia amputated Mongolia from the rest of China. We may recognize that Manchuria is an integral part of China, but so is Tibet, Mongolia and Sinkiang. We have refused to interfere on behalf of China or protest against the attitude of Great Britain and Russia. We can not fairly now force ourselves into the dispute over Manchuria. The issue is one between China, Japan and Russia, one that we will do well to keep out of.

The Problem of Manchuria

What Should be the Attitude of the United States?

A Regional Alliance Between China and Japan or an Oriental Platt Amendment Covering Manchuria Suggested as a Practical Solution

By George Bronson Rea

THE Chinese contend that the 1915 treaty is invalid because it was extracted under duress. Now, it is a poor rule that fails to work both ways. In 1895, China and Japan went to war over Korea. Under the terms of the peace treaty drawn up at Shimonoseki, China ceded to Japan the Liaotung Peninsula but, before the treaty was signed, Russia, supported by France and Germany, advised Japan to return this territory to China. Japan could not fight the three strongest military Powers of the world; so was constrained to do as she was advised. Now, as far as China was concerned, she deeded the Liaotung Peninsula to Japan. It belonged to Japan by right of conquest but Japan was compelled to hand it back to China under the terms of an ultimatum or, UNDER DURESS.

China forgets this incident and refuses to go behind the 1915 treaty in discussing Japan's rights in Manchuria. At the Washington Conference, when this question was threshed out China reserved to herself the right to reopen the question on all future appropriate occasions. In 1923, on the expiration of the original lease, she notified Japan to get out and, early this year, protested against an American loan to the South Manchuria Railway on the grounds that Japan's rights were invalid.

Japan stands firmly on the sanctity and validity of the 1915 treaty. She declares that, if China's contention be admitted, it would create a most dangerous precedent. Japan is in possession. She refuses to discuss the question with China or permit any third Power or international tribunal to intervene in the dispute. A very definite and acute issue therefore exists.

Now, if China's contention is accepted, Japan's rights in Manchuria must be defined by the terms of the Portsmouth Peace Treaty. The lease to the Liaotung Peninsula lapsed in 1923 and the railway rights expire in 1933. If Japan is forced back to Portsmouth to define her position in Manchuria, surely, in view of China's confession at Washington, Japan has the right to demand a reopening of the Portsmouth negotiations based on that confession. In common law she would have that right and, as there is no statute of limitations to shield a nation from the consequences of its acts, it would seem that Japan has a very strong case upon which to rest her demand for adequate reparation from China for her part in the alliance which made the Russo-Japanese war possible.

Is an amicable solution to the problem possible? Dr. Wu, the distinguished representative of China, has intimated that an agreement can be arrived at along economic lines. He says that China is willing to recognize Japan's economic rights under a guarantee that they will be protected by China. In effect, he says to Japan; "if you will withdraw your railway guards from Manchuria, the Chinese army will protect Japanese lives and properties and defend your interests against outside aggression." Fair enough, if China is in a position to carry out her guarantee. Undoubtedly, Japan would consider such a proposition if the issue involved concerned only China and herself.

Unfortunately, the issue is a three cornered one. Dr. Wu overlooks the important strategic angle arising from Russia's position in North Manchuria and her virtual protectorate over Outer Mongolia. Before the Japanese can even consider the Chinese viewpoint, the status of Outer Mongolia should be definitely determined, for as long as this vast region remains under Soviet domination, it constitutes a standing menace not only to China but to Japan and, until such time as China is strong enough to defend her territory against aggression, Japan will not surrender her right to protect her vital economic and strategical position in South Manchuria. As Mr. Matsuoka, the vice-president of the South Manchurian Railway recently put it; "The Chinese may call this a 'protectorate,' you can call it anything you like.....it will not change Japan's determination to protect the lives and properties of her nationals and preserve the peace of Manchuria.....Manchuria is our first line of defense." This is a clear cut pronouncement of policy, summarizing in a few words, Japan's strategic interests in the territory. Is Japan justified in taking this stand?

Dr. Wu has compared Japan's intervention in Manchuria with our own intervention in Nicaragua. I am sure he loses the real point of American policy. The attitude of the American Government towards intervention in these Caribbean countries has been so clearly and forcibly brought out in the discussions before this Institute that it is superfluous for me to go over the subject except to state that protection to American lives and properties abroad is now recognized by both major political parties as a fundamental obligation of government. President Coolidge summarized this obligation in his Gettysburg speech when he said. "*A government that failed in its duty to protect the lives and property of its citizens would be justly condemned at home and covered with derision abroad.*" Senator Fess emphasized it in his keynote speech at Kansas City. The Republican party reaffirmed the principle in its platform. Mr. Hughes at Princeton also gave an illuminating address on our right to intervene. Ogden Mills, in a recent issue of Foreign Affairs concludes a defense of the administration with the following words: "*The right and duty of intervention are so well established under international law that for the United States to avoid its responsibilities would be a derogation of its sovereignty.*"

We cannot apply a principle for the defense of our own national security and deny to another great Power the right to invoke the same principle when its own national existence is placed in jeopardy. If we are justified in enforcing a doctrine devised to secure our nation against possible aggression, then Japan is equally justified in enforcing a similar doctrine where her own vital interests are concerned. We Americans go even further and harp on our moral obligation to intervene in the name of humanity, pointing proudly to the material advantages that our intervention has brought to the people of these Caribbean countries. We declare that the peace, prosperity and security that has followed our intervention has brought far greater benefits to the people than any temporary

Engineering Notes

Roads for Samshui.—The *Hsien* authorities of Samshui, Kwangtung province, have adopted an extensive program of road construction covering the next few years. The first road to be made will be from Samshui to Tsingyun.

Military Road Building.—The 26th Army stationed at Potowchen, Chihli province, has given notice that roads connecting Potowchen with neighboring towns will be constructed by the soldiers, work to start within a fortnight.

Peking-Pukow Through Traffic Delayed.—On account of the shortage of rolling stock and engines, the contemplated through express train service between Peking and Pukow cannot be inaugurated as announced by the Ministry of Communications.

Motors Cars in Canton.—According to official statistics there are at present 73 motor trucks, 58 motorcyles and 745 automobiles running on the streets of Canton. The Municipality is paying great attention to the road and has adopted strict rules for regulating traffic.

Extension of Taonan-Angangki Railway.—For the extension of the Taonan-Angangki Railway, over 2,000 workmen were sent from Yingko, Fengtien province, to Angangki a few days ago, and will start work immediately upon arrival. Work on the railway between Tsitsihar and Heiho will also begin soon.

Important Wireless Scheme.—The Government has decided to install a powerful wireless station in Shanghai, with branch stations in Yunnan province, Sian, Shensi province, Hankow, Nanking, Canton and Sinkiang. The plan is said to be on a large scale but details as to machinery and equipment are not yet available.

Communication Program.—The Minister of Communications has proposed the following for the purpose of national development. 1. Installation of long-distance telephones. 2. Establishment of factory for the construction of railway engines. 3. Installation of wireless communication throughout the country. 4. Territorial division of the country for the construction of railways. 5. Institution of steel mills and dockyards.

Radio in China.—According to the proposed plan for the establishment of a National Radio Communication System to be submitted by Mr. Wang Peh-chun, Minister of Communications, for discussion and approval at the forthcoming National Communications Conference, the whole country will be divided into four districts, with broadcasting stations in various important centers of the districts numbering 77 in all. The power of the stations ranges from 150 watts to 500 watts. In addition to these stations, six short-wave radio stations will also be erected in different parts of the country for communication with the outside world.—*Kuo Min News Agency.*

Wirelesss Telephones in Chekiang.—To improve the intelligence service in the various districts and cities of the province, the Chekiang Provincial Government has formulated an extensive plan for the installation of long-distance telephone service connecting the different districts and cities. The following four main lines will first be installed :

First line to link up Hangchow, Yuhang, Wukang, Wuhing and Changhing, covering a distance of 250 *li*.

Second line to link up Yuhang, Linan, Yucheng, and Changhwa, covering 133 *li*.

Third line to link up Hangchow, Chuchi, Shinghsien, Sinchang, Tientai, Linhai, Hwangtao, Wenling, Haimen, Lohching and Yungchia, covering 1,254 *li*.

Fourth line to link up Chuchi, Iwu, Lanchi, Tanchi, Lungyu and Chuchow, covering 332 *li*.—*Kuo Min News Agency.*

Broadcasting at Nanking.—For the dissemination of propaganda relating to the Nationalist Government, it has been decided to erect a broadcasting station at Nanking from which news will be spread throughout the country.

Telegraph Administration in Kiangsu.—Improvements have been made in the telegraph administration of Kiangsu province and monthly receipts have doubled. The present program is to open branch offices in all *hsiens* hitherto not connected by telegraph.

New Roads for Nanking.—As the casket of Sun Yat-sen will soon be moved to its future burying place at Tze Chin Hill in Nanking, two new roads will be built to that point from Hai Lin Gate and Shen Tse Gate. The roads will be 160 feet wide and 6 miles long. They are to be finished in four months at a cost of $1,600,000. Construction will be under the supervision of the Mayor of Nanking.

Wireless in Manchuria.—The installation of wireless stations in Manchuria started with the transfer of the Russian wireless station in Harbin in 1925 to the Chinese authorities. Since then stations have been installed in Fuchin, Yenki, Heiho, Manchouli, Kirin, Tsitsihar, Changchun, Newchwang and Mukden. The annual expenses for these stations are $400,000, but receipts barely reach $100,000. The stations are under control of the Northeastern Wireless Department.

Canton-Hankow Railway.—The Canton-Hankow Railway is of three sections, from Wuchang, Hupeh province, to Chuchow, Hunan province, about 200 miles, being already completed. The southern section, from Canton to Shaokwan, 136 miles, is also built. The central section, from Chuchow to Shaokwan, about 200 miles, remains to be built. The section passes through mountainous country, where a part of the embanking has been done. The cost of building this section is estimated at $30,000,000, which the Canton Government propose to raise from the merchants of Canton. Preparations are being made to commence the work, which, with the aid of soldier labor, may be completed next spring.

Telephones for Chekiang.—To improve the intelligence service in the various districts and cities of the province, the Chekiang Provincial Government has formulated an extensive plan for the installation of long-distance telephone service connecting the different districts and cities. The following four main lines will first be installed : First line to link up Hangchow, Yuhang, Wukang Wuhing and Changhing, covering a distance of 450 *li*. Second line, to link up Yuhang, Linan, Yucheng and Changhwa, covering 134 *li*. Third line to link up Hangchow, Chuchi, Shinghsien, Sinchang, Tientai, Linhai, Hwangtao, Wenling, Haimen, Lohching and Yungchia, covering 1,254 *li*. Fourth line to link up Chuchi, Iwu, Lanchi, Tanchi, Lungyu and Chuchow, covering 332 *li*.

Commercial Air Service for Canton.—The General Chamber of Commerce of Canton has decided to operate a commercial air service with a capital of $200,000, divided into 10,000 shares of $20 each, to be paid in four instalments of $50,000 each. After the first payment two hydroplanes, each capable of carrying four passengers and several tons of cargo, will be operated between Fatshan, Tsengshing, Shiuhing, Taileung, Sainam, Kongmoon Sheklung, etc. After the collection of the second instalment, a larger hydroplane will be added to the service, which will be extended to Hongkong, Amoy, Macao, Foochow, Shanghai, Nanning and Wuchow. After the third payment and the purchase of another plane Northern ports like Nanking, Hankow, Kiukiang, Changsha, Tientsin, Chefoo, Tsingtao and Newchwang will be included in the service. With the addition of a fifth plane it is hoped to connect up with foreign ports like Singapore, Soerabaya and those in Siam, French-Indo China and the Philippine Islands. Only Chinese citizens will be allowed to invest money in the enterprise.

Otamagawa Suiryoku Denki K.K. (Otamagawa Hydro-Electric Co., Ltd.) A new electric power company is being promoted by Seiji Kimura, of Oura Mura, Ishiki Gun, Fukushima Prefecture, and 26 others. The company has water rights at Akai Mura and Nagato Mura in Ishiki Gun on the Otama River, granted on May 18. The new company is to be capitalized at Y.700,000; number of shares 14,000 (face value, Y.50 a share), of which 9,700 shares to be allocated among promoters, balance 4,300 shares for public subscription.

The intake is to be constructed at Takahagi in Akai Mura, and the power plant at Nagai in Nagato Mura. Length of the waterway will be 2,000 ken (or about 364 meters), effective head 404 feet, power capacity 1,700,000 k.w. Construction will be started in the near future, to be completed about November next year, at a cost of Y.700,000.

Automatic Looms.—With the present capacity of 350 looms a month, Toyoda Automatic Loom Works is unable to meet the increasing volume of orders, and is now carrying on extensions to increase the capacity to 400 looms a month, to be completed before the end of this year. Next year the company expects further to increase it to 500 looms a month.

Automatic looms installed by the Toyoda Works in the past-principal mills only—include the following:

Aichi Orimono K.K. (Textile) .. 902 looms, completed June, 1928
Kawachi Boseki K.K. (Spinning) 500 „ „ July, „
Osaka Godo Boseki K.K. („)1,500 „ now under installation.

Other spinning and weaving companies, such as Toyo Boseki, Dai Nihon Boseki, etc., are experimenting on several looms manufactured by Toyoda. Results are considered satisfactory and orders are expected in the near future.

Sales price of Toyoda Automatic Loom is reported at Y.600 a loom for 42-in. width, Y.30 higher per every inch wider.

According to investigations made by the Japan Cotton Spinners Association, there are about 7,000 automatic looms out of 70,000 looms used by its members, being 10 per cent. The operating efficiency of these automatic looms, however, is 33 per cent. of the total.

The standard motion of the Toyoda Automatic Loom is 200 revolutions per minute, compared with that adopted by English weavers, 160 r.p.m. Some companies in Japan are operating at 260, but this is considered too fast to ensure even qualities, in the case of Toyoda loom.

Singapore Dock.—Insurance arrangements have been completed in London to cover the voyage of the new floating dock from the Tyne to Singapore. The towage presents problems of peculiar difficulty, and elaborate arrangements have been made to ensure its safe passage. The start from the Tyne will be made some time during the present month, and it is expected that the journey to Singapore will occupy about four months.

The dock will be towed in two sections, each in charge of four exceptionally powerful tugs. The first section will be 465 ft. long and 172 ft. wide, the second 390 ft. long and 172 ft. wide. Although the sections will draw on an average no more than about 8 ft. of water, above the water they will show a height of about 75 ft. The exposure of so large a surface to the wind must necessarily be a source of anxiety. Arrangements have been made to ensure that the passage through the Suez Canal should be made with the least risk to the dock and the canal and with the least disturbance of the canal's ordinary traffic. It is expected that the passage of the canal will occupy about four days. The "tow" will only move during daylight, as owing to the dock's great width it will be necessary to remove all the lighting buoys during its transit. The first night will be spent in a "garage" excavated in the bank at a point between Port Said and Ismalia. On the second, third, and fourth nights the "tow" will rest at Lake Timsah, Grand Lake, and the Gulf of Suez respectively.

The eight tugs to be used in this difficult and hazardous undertaking are owned by Messrs. Smit and Co., a Dutch firm which makes a speciality of heavy long-distance towing. The tugs are two-masted and two-funnelled and in size average about 400 tons. They are not unattractive-looking vessels, although of necessity built to stand enormous and prolonged strains.

Railway Bridge in Chekiang.—Following a conference between Mr. Wang Peh-chun, Minister of Communications, and Mr. Li Hou-sen, Managing-Director of the Shanghai-Nanking and Shanghai-Hangchow Railways, it is understood that the Ministry of Communications will immediately undertake the construction of an iron bridge across the Chientang River, at a suitable point below Hangchow, to facilitate railway communication between Ningpo and Hangchow.

Local authorities have been notified by the Ministry that surveying engineers are proceeding from Shanghai to Hangchow to determine the location where the bridge is to be built.—*Kuo Min News Agency.*

Automatic Couplings in Japan.—A very interesting pamphlet has reached us from the Japanese Ministry of Railways at Tokyo, through the courtesy of Mr. S. Suzumura, the London representative, relating to the adoption of automatic couplings on the Japanese railways. We have previously referred to the inauguration of this great change, which took place in July, 1925, and which assured to Japan the honor of being the first country to carry out completely, and on a national scale, the recommendation of the International Labor Conference at Geneva in 1923. The appearance of this pamphlet is, moreover, especially opportune in view of the decision of the International Labor Conference at Geneva this month to establish a special committee to investigate the question of securing the general adoption of automatic couplings. The pamphlet sets out in detail the work of planning and organizing the change-over in Japan, and describes, with ample illustrations and statistical data, the actual carrying out of the work, and sets forth some of the results achieved. The Japanese railways used screw and link couplings from the construction of the first line in 1872, and although, shortly after nationalization in 1906, the engineers conceived the project of adopting automatic couplings, it was not until 1918 that effective steps could be taken to put the policy into force. The change has resulted in a great reduction in the number of accidents, and made possible an increase in the tractive power of locomotives and the efficiency of brake action on trains.

M.-H.R. to Become Purely Government Enterprise.—The Mukden-Hailung Railway, opened to traffic last autumn, was built with $40,000,000 Mukden "big money," equally shared by the Fengtien provincial government and people. The Government has now decided to make it a purely Government enterprise by buying up all stocks held by the public. It is said that Mr. Chang Yin-hwai, at present acting Minister of Communications, will be appointed Director of the railway after reorganization.

Extension of Tsang-Shih Line.—As a suggestion to extend the Tsangchow-Shihkiachwang Railway in Chihli province to Ichowfu in Shantung province has met with the favorable consideration of the Ministry of Communications, the latter is sending out a surveying party to survey the section from Tsangchow to Ichowfu for reference purposes before making a decision on the suggestion. No railway between Tsangchow and Shihkiachwang yet exists, though proposals for a loan for construction have been put before many groups of foreigners in recent years. The route was surveyed, and earthwork, used as a road, was done as a famine relief measure, to which the British-American Tobacco Company contributed $100,000 some years ago.

Through Traffic between Government Railways.—The Ministry of Communications has instructed the authorities of the Peking-Mukden, Peking-Hankow, Peking-Suiyuan, Tientsin-Pukow, Kiaochow-Tsinan, Kirin-Changchun and Szepingkai-Taonan Railways to devise means for immediate resumption of through traffic between these lines, in order that their receipts may grow. Through traffic between the Government railways has been suspended for a long time on account of the civil war.

Construction of Tsitsihar-Angangki Line.—An agreement was recently reached between the Heilungkiang provincial authorities and the Ministry of Communications that the provincial governments of Heilungkiang and Fengtien and the Ministry of Communications should each contribute $400,000, the last-named in building materials, for completing the railway from Angangki to Tsitsihar, Heilungkiang provincial capital.

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HOOVER IN CHINA

The Story of the Kaiping Mining Deal

By Geo. Bronson Rea

HERBERT HOOVER is the President-Elect of the United States, the highest honor that his fellow countrymen, proud of his record and achievements, can bestow upon him. During the pre-convention months a vigorous campaign was waged to prevent his nomination. His political opponents combed the world for evidence that could be used against him. They dug up the old Kaiping Mining deal and tried to fasten on Hoover the charge that he had double-crossed the Chinese and sold them out. The records of the trial for the recovery of administrative control over the properties held in London in 1905, were reprinted and the decision of the British judge presiding at the trial reproduced in the "Congressional Record." The evidence was twisted and distorted in order to make out a case that would stop Hoover at Kansas City. The following story was written last March and has been held in Washington for release in the event that the truth about the Kaiping deal was considered of sufficient importance to counteract the reports, then in circulation. The facts outlined below are as near to the truth as it is possible to arrive at after a lapse of twenty-eight years.

The story of the Kaiping Mines is essentially a China story, of immediate interest to the Chinese themselves who are now planning to exercise their right to take over the properties as soon as their finances will permit. The Chinese are looking forward with hope and confidence that American capital will come to their immediate assistance in the rehabilitation and reconstruction of their ruined country. They believe that Herbert Hoover is their friend and will help them. They are right. Hoover is a friend of China. No man in the United States has a better appreciation and knowledge of the wonderful opportunites for development offered by this country. Hoover knows the Chinese, but labors under no illusions about their ability and capacity to manage large undertakings.

FOREWORD: In the heat of the intense pre-convention campaign, the old story of Secretary Hoover's connection with the transfer of the original Chinese Engineering & Mining Company's properties to British registry is being dragged into the limelight of politics in an attempt to prevent his nomination. The story goes back to the exciting days of the Boxer Rebellion when the massacre of missionaries and the attacks on the Legations, staggered the civilized world and brought about immediate reprisals by the armed forces of all the Powers. The report of the trial for the recovery of control over the property before the High Court of Equity in London and the subsequent decision of the Court of Appeals was published in the London and China newspapers of that date. The Memorials to the Throne, the Imperial Mandates and other Chinese official correspondence and documents bearing on their side of the case, together with the reports of the public meetings of the shareholders called to protest against the transfer are reported at length in the Tientsin, Shanghai and Hongkong newspapers.

The story in a garbled form was given publicity in a Washington political weekly on February 25 and reprinted by various newspapers throughout the country. This version, however, was based solely on the reports of the case tried before the High Court of Equity in London in 1905 and the decision handed down by Justice Joyce. Senator Overman (Democrat) of North Carolina took occasion to have a copy of this article together with the full text of Justice Joyce's decision reprinted in the *Congressional Record*.

This elicited a prompt reply from Secretary Hoover's friends. Senator Lenroot of Wisconsin, who went over all the evidence in the case, wrote a letter to Congressman Free of California, reviewing the legal aspects of the case and exonerating Mr. Hoover from any improper connection with the deal, a conclusion eminently justified by the facts. This was also reprinted in the *Congressional Record* and supplemented by a letter of the same nature from Baron de Cartier, former Belgian Ambassador in Washington and, during the Boxer Rebellion and the years immediately following, Belgian Chargé de Affaires in Peking.

The controversy reopens one of the most spectacular international questions connected with the alienation of Chinese sovereignty and control of the most valuable and extensive coal fields in the country, together with the possession of an ice-free, strategic port in the Gulf of Chihli; a deal that was put through when China was at war with the world in order to preserve the properties from confiscation as spoils of war by one of the hostile nations whose armed forces then occupied the property.

The Kaiping story is far from being dead. It is very much alive and will again come up for consideration when the Chinese are in a position to exercise their rights under the Kailan Agreement of 1912 to purchase the Kaiping properties at a price to be agreed upon between them and the British shareholders. In view of all the facts in the case, involving the standing of the lone American who participated in the deal, it is better for the nation and for Mr. Hoover himself that the facts are presented at this time rather than invite their rehearsal at some future date from unfriendly Chinese or European sources.

* * *

The Background of the Story

The story of international finance in China is one long record of double crossing, bad-faith and political intrigue so interwoven with European diplomacy of the old school, that it is impossible to dissociate one from the other. With few exceptions, every financial group that has operated in China has been in some manner the instrument to promote the special interests of its government. China's own tortuous diplomacy was responsible in large part for this close alliance between European finance and politics. Little by little the truth surrounding the events of the early part of the century has been revealed; a fact here, a document there, an admission in some biography, the memoirs of some statesman or financier, together with the publication of official records, have all contributed to clarify a situation that confused the most expert

investigators. The record is still far from complete. All the ramifications of the celebrated deal which converted the old Chinese Engineering & Mining Company into an Anglo-Belgian enterprise will never be revealed until the secret archives of the British and Belgian governments are opened to the historians. The main facts, however, are on record. The legal side of the case was taken to the highest court of appeal in England and the promoters absolved from any financial wrong-doing. That verdict stands. Whatever claim for damages the British courts conceded to the Chinese has since been settled. That part of the slate is wiped clean.

Russia and Her Allies

Then, as now, the disturbing factor in world politics, was Russia. The storm center lay in Central Asia, where Russia was frantically building strategic railways and pushing her outposts up to the frontiers of Afghanistan with the determination of forcing an issue with England over the possession of India. Blocked at every step in her plans to invade India from the north and northwest, Russia suddenly changed her tactics and started to clear a way for her armies to reach their objective from the northeast. To do this, she had to dominate China and create a path through Chinese territory. Russia's program of conquest by railway by means of which she had ruthlessly brought all of Central Asia under subjection, was then extended eastwards towards the Pacific. These schemes called for enormous amounts of money which Russia at the time could not supply. Her French ally supplied this deficiency and supported the program at all times with her own diplomacy and schemes to harass Great Britain on her Burma borders. When it was considered too dangerous for either of these two great powers to disclose their hand, the execution of the plan was entrusted to Belgium, which obtained the coveted concessions and financed them with French money.

"The Partition of China"

The plans of Russia were made possible only by the terms of the secret treaty of alliance entered into with China in May, 1896. This agreement let Russia into Manchuria, and two years later brought her to the tip of the Liao-tung peninsula and the control of an ice-free, deep-water port, enabling her for the first time to challenge British naval supremacy in the Pacific. Every forward step by Russia in the north was followed by a corresponding advance of her French ally in the south. Every move made by Belgium dovetailed into the Franco-Russian scheme of conquest.

So we come to 1900 and the Boxer Rebellion. This was Russia's opportunity. She flooded Manchuria with her armies, closed it to foreign commerce, converted it into a viceroyalty and commenced to place in execution her carefully prepared plans to annex not only The Three Eastern provinces but the whole of North China as well. One of her first acts was to seize the Imperial Railways of North China, hypothecated to British bond-holders, eject the British engineer-in-chief and his staff in violation of the loan agreement, and place the line and its operation under Russian military direction. By July 8, the line was completely under Russian domination. In view of their strong position, the council of admirals, headed by Admiral Seymour, decided on July 17, that the line between Taku and Tientsin should be managed and guarded by the Russians, then in possession. At the same time, however, the British Government warned St. Petersburg that it must be clearly understood that the railway would revert to its former status on the termination of hostilities.

The Russians then seized and hoisted their flag over the properties of the Chinese Engineering & Mining Company, ousted the foreign staff, stopped mining operations and prohibited the further sales of coal. This was the situation in the summer of 1900, when Chang Yen-mao, the Chinese Director-General of the above company, turned to Mr. Gustav Detring, his confidential foreign adviser, and entrusted to him the task of registering the company under British law in order to save the mines from being seized by Russia as spoils of war.

The Kaiping Mines

The Chinese Engineering & Mining Company of Tientsin was established in 1878 by Tong King-sing, one of the most enlightened and enterprising Chinese businessmen of his period. It was he who discovered the commercial value of the Kaiping coal basin and obtained the concession for its working from the Throne and whose money and brains carried it through to a commercial success. Chang Yen-mao, a typical official of the old Manchu régime and a henchman of Viceroy Li Hung-chang, engineered the concession through the official channels for Tong, became interested financially in the company and, on the demise of the latter, succeeded him as director-general. Under Tong's administration, a British engineer, Mr. Claude Kinder, was brought out to supervise the working of the properties and through his influence the first railway was built in North China to connect the mines with Tientsin and the seaboard. Chang Yen-mao went up the official ladder until he became Imperial Commissioner of Mines, at the same time holding his position as director-general of the Kaiping properties.

For twenty years, the enterprise prospered to a degree the outside world never dreamed of, for although only a modest dividend was distributed to the shareholders, a handsome revenue came into the Government coffers and the pockets of the officials and directors through methods which only a Chinese would

President-Elect Hoover

understand and appreciate. The output of the mines rose at times to over 4,000 tons per day, necessitating the purchase of a fleet of six steamships, with wharves and storage yards in other Chinese ports to facilitate distribution of the coal. This, in turn, called for the construction of an ice-free port on the Gulf of Chihli to ensure continuous service during the winter months when fuel was in greatest demand. Under a special concession from the Throne, the company, therefore, acquired the land at Chingwangtao and started the construction of a pier, breakwater, loading and storage facilities and a spur railway connecting the port with the mines and the main line of the Imperial Railways of North China (now the Peking-Mukden line).

The company was capitalized at Taels 1,500,000 (say $1,125,000) but its average dividend for years had never exceeded $100,000, a rough nine to ten per cent. Notwithstanding this favorable showing after the government and the officials had diverted the major part of the profits into their pockets, the company ran deeper and deeper into debt. By 1900, its liabilities approximated Taels 4,000,000 and the creditors were clamoring for foreclosure, but being a semi-governmental enterprise, it was difficult to bring suit in the ordinary way through the Chinese courts with any hope of success. The six steamers had been hypothecated to the German Bank (Deutsche Asiatische) and when the Boxer troubles broke, the German admiral promptly seized and placed them under the German flag. As a matter of fact, the financial condition of the company had fallen so low that when the Russians occupied the mines and the Germans seized the ships, its shares were worthless. In addition, Chang Yen-mao, suspected of being in communication with the Boxers, was arrested, thrown into prison and would probably have been executed had it not been for the timely intervention of his foreign friends.

Some years previous, a Mr. C. Moreing, of the firm of Bewick, Moreing and Company, mining engineers and financiers of London, visited Tientsin and was received in state by Chang Yen-mao. Chang was interested in obtaining new capital to develop the mines and discussed with Moreing various plans to convert the enterprise into a Sino-British Company. When the latter departed for England, he carried with him a tentative proposition along these lines; together with a contract for furnishing a loan of £200,000 to the Chinese company to be issued in installments as funds were required for development work. Because of the uncertain political conditions in China, these bonds carried a high rate of interest, and a large proportion found their way into Belgium and Germany, thus giving to these countries a favored lien on the properties. Several propositions to convert the company into a Sino-British concern were subsequently advanced, but they all fell through because the Chinese insisted upon retaining administrative control. European investors would not hazard their capital in a Chinese enterprise under such conditions.

The Belgians, working as agents of Russia, were deeply interested in securing control of these properties. They already operated the Peking-Hankow line and were scheming to take over the Canton-Hankow concession while co-operating with Russia in ousting the British from the Imperial Railways of North China. Possession of the mines fitted into the Russo-Franco-Belgo scheme of conquest, for aside altogether from their commerical value, the ice-free shipping port of Chingwangtao on the Gulf of Chihli, was of immense strategic importance, a possible naval base that would come in handy when Russia made her next forward move.

Germany also had her eyes on the property and, as usual in the old days, we find her working closer with the Chinese than any of the other powers. Chang Yen-mao's intimate foreign friend and adviser was Mr. Gustav Detring, a commissioner in the Imperial Chinese Maritime Customs Service. This was the man who Li Hung-chang sent to negotiate the treaty of peace with Japan after the Sino-Japanese war. Japan properly refused to accept him as a proper representative of China and Li was forced against his will personally to negotiate and sign his own humiliation. Detring was also the same man the German Government had tried to force upon China as successor to Sir Robert Hart, and whose intrigues to bring this about two years before, led Great Britain to extract a promise from China that as long as British trade predominated in the country, the Inspector General of Customs would be a British subject. Detring was also a shareholder in the Chinese Engineering & Mining Company. Through his influence, several loans were placed with the Deutsche Asiatische Bank and German investors urged to buy up the Kaiping bonds issued by Moreing.

Hoover Enters the Picture

This was the state of affairs when the Russian forces seized the Imperial Railways of North China and the Kaiping Mines in the early part of July, 1900. Faced with complete loss of their properties, and fearing for their lives, the Chinese were willing to accept any arrangement which would save the situation. Chang Yen-mao called in his confidant, Detring, turning over to him his powers as Director General with full authority to transfer the property to British registry and protection. Some time previous, Chang had requested Mr. Moreing to send him an experienced engineer to act as adviser to the Imperial Bureau of Mines. Moreing sent him one of his best men who had just completed a difficult job in Australia. Here enters Mr. H. C. Hoover. He arrived in Tientsin in 1899 to take over this important Chinese Government position and for more than a year was busily engaged in investigating and reporting on the mineral deposits of North China. He established his home in Tientsin and the outbreak of the Boxer Rebellion found him there actively engaged with other foreigners in defending the settlement against the Boxer assaults.

As Moreing's syndicate was already deeply interested in the property, Detring got in touch with Hoover and discussed plans to organize a new British company to take over the title. Hoover, however, had no power to act for Bewick, Moreing & Company. When he accepted the Chinese Government position he severed connection with his old employees. He accordingly telegraphed to London for instructions and in reply was authorized to act as the representative of Bewick, Moreing & Company to sign and accept a preliminary agreement for the transfer of the mines, but his principals declined to bind themselves to anything until they had an opportunity to study the provisions of the contract. Time being the essential element in the transaction, whatever was done had to be done at once.

The plan discussed between Detring and Hoover was almost identical with that which had been the subject of previous negotiations. The mines were to be transferred to Bewick, Moreing & Company, who were to organize a British company capitalized at £1,000,000. The Chinese shareholders were to receive £375,000 for the property and £100,000 in new shares were to be issued in England to obtain working capital, the balance (£525,000) less expenses and promotion fees, was to go into the company treasury to be issued as development work required. Under this arrangement the Chinese would retain control and it was so stipulated in the agreement.

Based on these conditions, a deed of sale was drawn up transferring the ownership of the mines to Bewick, Moreing & Company, Hoover was therefore not a principal. He was merely the stakeholder, intermediary or agent appointed by Bewick, Moreing to accept a conditional contract in their name.

Other versions of the incident state that he received the deed in his own name with the idea of transferring the property to American protection and, being unsuccessful in interesting American capital, sold the properties to a British syndicate. This would make Hoover personally responsible for all that followed and bring upon him the charge of committing a breach of trust. As time was the essential element in the deal, Hoover would have been compelled immediately to register the title deeds in the American Consulate, thus impairing their protective value, complicating the new financing and requiring the British syndicate to purchase the property direct from him.

The fact is, that immediately on receiving his commission, Mr. Hoover started on his journey to London and on his arrival handed over the deed and other papers to his principal, Mr. Moreing, and faded from the picture. As noted above, Detring took upon himself the sole responsibility for the initial deal in behalf of the Chinese Company and Mr. Moreing admitted at the trial in London in 1905 that he was personally responsible for what happened after the deed was delivered to him. These two statements completely absolve Mr. Hoover from any connection with the transaction other than that of a temporary stakeholder or agent.

Many of the popular "success" stories of Hoover's career state that he made his first million in China and the inference is that this must have come from his share in the profits of the Kaiping deal. As a matter of fact, when Hoover completed his mission and handed the deed of sale to Moreing, he returned to California to start life anew. Within two months he was employed by the new British Chinese Engineering & Mining Company as Chief Engineer. He held that position from January to September 1901, nine months. On his return to London, after nearly three years in China, his entire capital was in the neighborhood of $30,000, all of it representing savings from his previous salaries. At that time Hoover was 25 years of age. He knew little or nothing about the intracacies of international political finance. His active experience had been confined exclusively to mining work. He had never been in London except to pass through it hurriedly when he went out to China. He had no connections in Europe and was practically nuknown in London except to the firm of mining engineers who recommended him to the Chinese Government for the post of Mining Adviser. Hoover's reports on the Kaiping properties undoubtedly carried great weight in determining their financing with new capital, but the statement that he was responsible for and directed these intricate international negotiations is incredible on its face.

After concluding his mission in London, Hoover returned to his home in California. He had hardly arrived there when he received a telegram from the newly organized company in London offering him the position of Chief Engineer of the mines and instructing him to proceed at once to China. So we find him again voyaging across the Pacific, arriving at his destination in January, 1901, just six months after his departure. We leave him here for awhile and return to London.

Now what happened in London is not altogether clear in some points. The record is straight enough on certain public information but deficient in regard to what went on behind the scenes. In the first place, Mr. Moreing immediately communicated with Lord Salisbury and the Foreign Office explaining the conditions under which the deed to the property had come to him and requesting official support. The situation was a peculiar one. Although the Chinese Engineering & Mining Company was nominally a private Chinese corporation, its connection with the Chinese government was such that its real status was that of a semi-official enterprise under the control of the Peiyang Viceroy. This was clearly revealed in the subsequent Memorandum of Transfer, which is reproduced in full further on.

To this statement must be added the Dispatch from the Throne of January 1904, commanding Chang Yen-mao to regain possession of the property, in which the Empress Dowager declared that the mines were state property and could not be alienated without Imperial authority. These facts disclose that the Chinese officials were seeking to transfer a Chinese Government property to foreign protection at a time when a state of war existed and when one of the hostile Powers had seized the mines and instructed its troops to retain possession at all hazards. On the face of things, the Chinese were engaged in a highly dangerous game.

On the other hand, the British Government was pledged to give a monopoly of its support to the British & Chinese Corporation to finance official concessions in China. This corporation had advanced the loan to the Imperial Railways of North China and also held the concession to work the Nanpiao Coal fields adjoining the Kaiping basin; in reality, part of the same field. At the very time the deed to the Kaiping mines was handed over to Bewick, Moreing & Company, the staff of the British and Chinese Corporation had been forced to flee from the Nanpiao properties. So we find that the official British Group was already firmly installed in North China and had the option on any financing in that district calling for governmental support. Britain, facing a crisis with Russia, had allied herself with Germany to take mutual measures to oppose Russia's aggressions in North China and could not even protect its official concessions in the district at that time, so when Moreing submitted a new proposition which intensified the existing crisis, the British Foreign Office side-stepped and declined to support the deal if called upon for official recognition and protection. The Foreign Office had no objection to the deal going through as a purely private venture, but positively refused officially to recognize it until the situation cleared.

From the business standpoint, the proposition was equally difficult. The precarious financial situation of the company; the occupation of the mines and port by the Russian troops and the almost certainty they would be confiscated or held as guarantees for the Russian indemnity, and the seizure of its steamships by the Germans, all operated against the public organization of a new company. As a business proposition it was worse than a gamble. To sell shares in such a risky enterprise to the hard-headed British investor was an impossibility. They could not even be advertised or put on the open market under such conditions. To do so would have precipitated immediate complications with Russia, something that the British Government was trying to avoid until after the settlement of the Boxer troubles. Whatever was done to carry out the ideas of the Chinese, had to be conducted in secret.

Faced with these difficulties in transferring the property to British registry, Moreing was compelled to achieve his purpose in a roundabout manner. He took the proposition to Belgium and sold the deed to a group known as the Compagnie Internationale de l'Orient, already deeply interested in other important Chinese ventures. This syndicate was created by King Leopold and his intimate friends for the exclusive purpose of obtaining concessions in China to carry forward the political schemes of France and Russia. In order better to understand the subsequent misunderstandings which led to the lawsuit for recovery of administrative control of the property, it is necessary that the real character of this syndicate be outlined.

The Belgian Holding Company

When the Belgians obtained the concession for the Peking-Hankow Railway, the stipulation that the Russo-Chinese Bank should be the fiscal agent for the loan clearly revealed its political character, while the French Yellow Book for 1900, just as clearly reveals who financed it. This official document states that the Belgian company holding the concession, is a "Franco-Belgian syndicate in which the French element is represented by the big financial establishments of Paris and the big metallurgical industries of France," and, that the French financial share was three-fifths and the Belgian, two-fifths. The same book reveals, however, that when the loan was issued, the French banks subscribed to 84 per cent. and the Belgians 16 per cent. of the bond issue. In other words, the smaller Belgian companies organized to take over any particular concession, were merely the screen which concealed the big international financiers co-operating with Russia. All these smaller Belgian companies were subsidiaries of a holding Company, known as the Compagnie Internationale de Orient, (Syndicat de l'Orient), organized in Brussels on March 28, 1900, under the direct patronage of King Leopold and his business associates. The dominant interest in this new international combination was held by the following French banks, and industrial companies; Banque de Paris, Comptoir Nationale d'Escompte, Banque Ottoman, Banque Parisienne, Societe Generale, Hottinguer et Cie (a banking house closely allied with Russia). A. J. Stern & Company, Mallet Freres et Cie, Demarchy-Selliere, E. Gouin, head of the Societe Construction des Batignolles (the foremost rolling stock builders and railway constructors in France), Dutillsul, Banberger, de Germiny, E. Noetslin, etc. The German participants were the group of banks and firms represented by the Disconto Gessellschaft and the Deutsche Bank. Austria-Hungary was represented by the Weiner Bankverien and the Banque Commerciale Hongroise; Russia by Rothstein, of the Russo-Asiatic Bank, Keck, and the Banque Internationale de Commerce of St. Petersburg; Switzerland, by the Credit Suisse, Le Bankverien and l'Union Financiere; Holland by the Amsterdam Bank; Italy, by the Credit Italien, Banque Commerciale Italianne and Manzie et Cie, of Rome. The Belgian group was composed of the Societe Generale, the new Banque d'Outremer, Banque de Brussels and Banque Internationale, followed by a long list of 400 subscribers comprising banks, bankers, manufacturers and individual capitalists interested in the venture. The new company was presided over by A. Beernaert, with three vice-presidents, Houzeau de Lehaye, Nyssens, and Thys; the last two to take over the functions of administrators of important subsidiares. The permanent committee of the company, in addition to the above four names, included the following; M. M. Furhnaam, Hovine, Walford and Lavelaye.

It appears that this Belgian international group also operated in England through an unregistered private organization known in financial circles as the British Oriental Syndicate, in which Mr. Moreing was an outstanding figure. The sale of the Kaiping properties to the Belgian holding company therefore brought all the conflicting bond-holding interests into a common pool and made possible the new deal that was then put through. This incident only goes to prove that no matter how Europeans fought over concessions and contracts in China and other parts of the world, when it came to the financing, there was complete understanding amongst the international bankers who put up the money and shared the profits.

A new company was hurriedly organized in London to comply with the stipulation of the contract. According to Rockhill's Treaties and *The Financial News* of London, the articles of association drawn up by the original incorporators, gives the names of six British dummies (three clerks, two secretaries and one gentleman) subscribing to one share each, whose names never again appeared in the transaction or in the directorate of the company. Furthermore, the articles of association (see Rockhill's Treaties) were what might be termed a blanket charter, enabling the company to engage in anything from selling peanuts to running the Chinese Government. There was no mention or even the suspicion of an intention on the part of the new company to engage in the specific deal for which it was created, *viz*, to take over as a going concern, the properties of the Chinese Engineering & Mining Company, other than in the name of the company. In fact, *The Financial News* of London, (January 8, 1900) referring to its registration said that "its object was to adopt an agreement (the parties to which are not named) and to carry on in China and elsewhere, the business of mine-owners etc.," and disclosing that the seven dummy incorporators were to appoint the first directors. Under the circumstances, the truth could not be permitted to come out. The agreement which the new British company was to adopt was not with the Chinese company but with the Belgian syndicate to whom the deed of sale had been sold.

The original draft of the articles of association contained a clause that control of the property in China should be vested in a China Board but as this conflicted with British company law it was apparently deleted from the final official document. When Hoover received his telegraphic instructions to proceed to China as Chief Engineer of the new company, he believed that this provision had been adopted. On his arrival at Tientsin, he reported to Chang Yen-mao that the agreement had been carried through and the new company formed. Shortly afterwards, Chang was informed by telegraph that the first installment of £100,000 had been paid in to the credit of the new company by the Banque de Outremer at Brussels. Hoover had been joined on his voyage to China by a Chevalier de Wouters, sent out as representative of the Belgian interests with instructions to assume the duties of general manager.

The main conditions of the deal being apparently complied with, the transfer of the old company to the new was duly signed on February 19, 1901, and with it a Memorandum setting forth the reasons and conditions of transfer. This document was signed jointly by Hoover and de Wouters on behalf of the new company and by Chang Yen-mao and Detring for the old. As all the subsequent misunderstandings and the law suit arose over the failure to live up to the provisions of this transfer, it is given here in full:

Memorandum

Relating to the Reorganization of the Chinese Engineering & Mining Company.

In consequence of the disturbances of last summer and the state of hostilities thereby created, serious danger arose for the status of the Chinese Engineering & Mining Company. One of the dangers being the confiscation of the property on account of the company's semi-official character in connection with the Chinese Government and another in the eventual cession by compulsion of the company's property.

In consideration of these eventualities it was thought in the interest of the Imperial Government and the Company's shareholders to convert the undertaking into an Anglo-Chinese company registered under English laws and protection. Another motive was that in order to overcome the financial difficulties caused by the hostilities, additional capital had to be raised by gaining foreign shareholders for the undertaking, a large sum of English money having already been advanced on the security of the Company's property.

His Excellency Chang Yi, Director-General of the Company accordingly appointed Mr. Gustav Detring to make the necessary arrangements which Mr. Detring did by signing on behalf of the Chinese Engineering & Mining Company with Mr. H. C. Hoover, acting on behalf of Mr. C. A. Moreing of London, a deed of sale placing Mr. Moreing in position to take the necessary steps with regard to the raising of capital in Europe and registering the company under British laws. It being understood that after conversion the Company should keep its name and be managed according to the articles of association covering as well the interest of the Chinese as of the foreign shareholders making all alike participants in profits and losses and that a working capital of £100,000 should be raised before the end of February. These main provisions of agreement having been acted upon by Mr. Hoover and notified to the Director-General Chang Yi, it has to-day been settled and decided that the Company shall in the future be constituted and managed as follows:

1.—The share capital of the Company to be £1,000,000.

2.—The Chinese shareholders to receive 25 shares of £1 each for each original share of Taels 100 each.

3.—The bona-fide liabilities of the Chinese Engineering & Mining Company up to the 19th day of February, including bonuses due to employees or shareholders from dividends or reserve funds shall be taken over by the new company and all what is due according to the final agreement entered into will be duly considered and honored.

4.—It is especially agreed to honor and duly repay the loans obtained from the Imperial Government, Taels 200,000 to be paid out of the first funds and the balance as quickly as possible.

5.—The shareholders whether Chinese or foreign shall have equal votes at all meetings of the shareholders when the company's affairs are discussed and questions decided.

6.—The management of the Company shall be conducted by two boards of Directors, one in China and one in London.

7.—His Excellency Chang Yi will be Director General resident in China as before, in general charge of affairs, and as such will have equal powers with foreign directors in China.

8.—The management of the property in China will be in the China Board.

9.—The London Board will be elected by all the shareholders, Chinese and foreign.

10.—It is understood that the word limited means the shareholders are in no case responsible for more than the nominal amount of their shares.

11.—It is also understood that all the legal taxes and duties payable to the Chinese Government will be paid by the Company as heretofore.

12.—It is also understood that the Director General will be the channel of all communications between the Imperial Authorities and the Company.

13.—It is understood that the Company will be managed in such a spirit as to make Chinese and foreign interests harmonize on a firm basis of equality to open an era of co-operation and protection that will enrich the Government and the people.

14.—All the unsettled accounts of the Company and questions relating to land tenure will be adjusted amicably by mutual consultation.

Dated this 19th of February, 1901.

Signed, sealed and delivered by Herbert C. Hoover and Chevalier de Wouters in the Presence of Alfred S. P. White-Cooper and C. D. Tenney	H. C. HOOVER Chevalier DE WOUTERS.
do. do. do.	CHANG YEN MAO
do. do. do.	G. DETRING.

As far as Hoover was concerned, these conditions were in line with those under which he had delivered the deed to Bewick, Moreing & Company, for as yet, he nor anybody in China knew the details of the financing in Europe. Hoover's job as Chief Engineer was to supervise the working of the mines and make them pay. Hoover tackled the job as any other American or European executive would have done, without any thought of Chinese official practices. The payroll showed some 20,000 coolies employed in the mines and in the construction of the Chingwangtao harbor works. In checking up, Hoover discovered that many thousands of laborers were drawing pay without showing up on the job. So he started the American brass check system, giving every Chinese laborer and employee a number and requiring that each check be turned in to the timekeepers as they entered and left the works. In the first month, this system disclosed that the pay-roll had been padded with some 8,000 names. At a wage of ten cents gold a day or three dollars a month, this put nearly $300,000 gold annually into the pockets of the officials. Other economies, abolition of squeeze in other forms and stopping the leaks considered legitimate in a Chinese enterprise, together with improved methods of working and reduction of costs, enabled Hoover to make the mine pay a handsome dividend on the new capitalization the first year.

Naturally, the Chinese opposed him from the start. Chang Yen-mao was especially bitter at the way the young American outraged all the ethics of official Chinese business methods. His first clash with Hoover arose over the title deeds to the property. It appears that Chang in his position as director general, had sold some of the company's property at Hongkong for Taels 75,000 and failed to turn the money in to the company's credit. In order to protect the interests entrusted to his care, Hoover demanded that the title deeds to all the company's properties in all the ports of China be turned over to some trustee and when objections were raised, he forcibly seized the documents and deposited them in escrow in a foreign bank. This resulted in a serious loss of face for Chang; the deepest humiliation that could befall a Chinese official. When, in addition, he saw his sources of revenues cut off under Hoover's brass check system, he began to realize that unless the control was again brought absolutely in his hands there would be no money for the Viceroy, nor for himself. He pleaded with Hoover to continue the old methods, defending his position on the grounds that he had only recently paid Taels 90,000 for the position of director general and was entitled by Chinese custom to get it back from the property. Hoover, however, had a $5,000,000 corporation with a bonded indebtedness of $2,500,000 that had to be turned into a profitable enterprise for the shareholders and he declined to permit any interference in the management of his end of the work. That Hoover's methods were justified is shown by the result of the first year's working. Whereas, the old company, capitalized at Taels 1,500,000 ($1,125,000) had never declared more than a nine or ten per cent. dividend (roughly $100,000) the new company showed a profit of $525,000 the first year on the new capitalization and $650,000 the second year. In other words, the old Chinese company had been milked by the officials to the tune of over $500,000 gold a year, which explains why its revenues were relied upon by the Viceroy to pay the expenses of the Peiyang fleet, as subsequently admitted in a Dispatch from the Throne.

Back in London

Once again we leave Hoover on the job and return to London. The details of the financing of the new company are somewhat involved, but sufficient evidence has been disclosed to gather an intelligent idea of how the deal was put through. In the first place, the promoters were confronted with liquidating the old company's liabilities, a statement of which formed part of the original deed. Nearly £200,000 of 11 per cent. debentures secured on the property, were held in Europe. Other debts to the amount of another £200,000 drawing an average 8 per cent. interest had to be settled and, when the transfer of February 19, 1901, was signed, still further liabilities were uncovered. In addition to one debt of Taels 75,000, the Peiyang Viceroy put in a claim for over Taels 500,000 loaned to the old Company, while Chang Yen-mao, the director-general, put forward a claim for Taels 600,000 for services rendered. There seemed to be no end to the company's liabilities once there was a prospect of new capital to liquidate them. Not only did the new company have to settle these outstanding obligations but provide a large amount of cash working capital to complete the costly harbor works at Chingwangtao. Approximately £600,000 were therefore necessary to put the new enterprise on its feet, something that could not be done under the proposed Chinese reorganization plan.

Now, no sooner had the Belgian syndicate acquired possession of the title deeds from Moreing than it cabled its agents in China to buy up all the Chinese shares offered. It is not known just how many old shares were bought in this manner, but it is known that the Belgians were successful in purchasing in one block the holdings of one of the most important Chinese shareholders (reputed to the holdings of Tong King-sin) paying for it only Taels 60 or 40 points under par. With other shares that came to them in this way, the Belgian Group practically controlled the company and were enabled to impose the financial conditions which placed it on its feet. Having obtained control, the new company issued six per cent. debentures in Europe to the amount of £500,000 to retire the old eleven and eight per cent. obligations, and gave as a bonus to the bondholders £250,000 in shares. The Chinese as per agreement, were allotted £375,000 in new shares in return for their old script, but as noted above, probably one-third or more of their participation had already been bought up by the Belgian Group. The balance of the shares (£375,000) went to the promotion syndicate, but it is not known how these were distributed.

A Vital Document

The only light that was thrown on the inside working of the syndicate was published in the form of a letter from a Shareholder to the Editor of *The Pall Mall Gazette* and reprinted in the *Hongkong Telegraph* of March 24, 1903. This letter clearly explains the new company's position in answer to the attacks upon it and should go into the record. It reads:

"It is a matter of considerable surprise that in all the communications emanating from the Director of the old Chinese company and their friends, so little mention has been made of the most vital of the documents on which the transaction is based. I mean those prior to the final transfer of the 19th of February, 1901. An examination of these documents would, I think, show that the charges of breach-of-faith made by the ringleaders in this agitation have no foundation. Although the later documents have been published in the press, these to which I now refer have never been disclosed, and it is not unreasonable to suppose anything that would tend to show that the other side had an answer to the insinuations that have been so freely made.

"It is not far to seek, the causes of this agitation. Before the transfer, the old Chinese Company distributed annually in dividends about £25,000 and in the last few years of its existence ran deeper and deeper into debt. Under the new management, installed by the present Engineering Company, on an output reduced by the Boxer troubles to a figure considerably under the average, the profits of the first year were sufficient to pay £75,000 in dividends and £30,000 in interest on debentures. Evidently by the transfer a leakage had been stopped, and anyone who knows the ways of the Chinese officials will perceive that the action of those now engaged in agitation against the present company may not be unconnected with the loss of profits that must have been secretly disposed of under the old régime. Coupled with this is the awakening of those who were shareholders in the old concern, who now see its value under more enlightened control, feel regrets, in spite of their income being increased, that it should have passed into the hands of the foreigners.....

"Again, it is desirable to remember the state of the property at the date of transfer. The mines were in the hands of Russian troops, who held strict orders to retain them. The ships were in the hands of German creditors and other property had been seized by the German troops under the shelter of martial law. In addition, there was a number of creditors for large amounts, who, had not the transfer taken place, would have seized the whole of the assets and reduced the value of the shares to nothing. As it was, shares could be had at a price equivalent to 3s. 6d. in the present company. These facts show the difficulty in floating the company on the London market at a time China was in turmoil and that it was not so easy a task as it had been represented to be.

"Your article omits other facts. In regard to the debenture issue of £500,000 at 6 per cent., it is not stated that there was an old issue of bonds for £200,000 secured on the property bearing interest at 11 per cent.; that there were other debts aggregating £200,000 bearing interest averaging 8 per cent.; that some of these debts were overdue; that these creditors had not only to be paid out but to be recompensed for surrendering a position which entitled them to foreclose and take possession of the property. No mention is made of the fact that the Chinese officials in 1900 were anxious to offer any inducement to get rid of those who were in occupation—military occupation—of the property, but fain forget their promises when this had been accomplished. It is not pointed out that for the recovery of possession of the property, diplomatic pressure had to be brought to bear. It is not pointed out that the company had to have money to carry through its great works at Chingwangtao harbor nor that the property which in the hands of its former administrators was worth a precarious £375,000, in stronger hands has become worth £1,000,000.

"Inquirers would find that after all these difficulties had been cleared up, the Oriental Syndicate had remaining to it 150,000 shares to be distributed amongst its many shareholders, and not 625,000 as intimated; that the debenture holders received a premium which they were in most cases in a position to demand, which even then, since the shares have found their levels after the boom in Shanghai, yield them a profit of not more than 25 per cent.; surely not too much in a mining venture in such a place as China.

"They will also find that the directors of the old Chinese company furnished a written statement showing that the real assets of the company after deducting liabilities, were less than £300,000, that they were glad at the time to be relieved of their desperate position and receive four-tenths of the new share capital and that it was they who insisted that the capital of the present company should be £1,000,000."

All the evidence in the case shows that the Belgians were in supreme financial control and with the arrogance which characterized their activities in those days, determined to run the company as a Belgian enterprise, managed, directed and staffed with Belgian appointees. All the troubles of the company for the first two years arose from this assumption of authority by the Belgians over an enterprise nominally under the British flag.

There is every evidence to support the categoric statement that it was this Belgian financial connection which imposed a strict

secrecy about the deal. The speech of Mr. Detring before the shareholders meeting is evidence that every effort was made to extract from the promoters the truth about the company's financial status and, that to every request for information they were put off. Only under the threat of a law suit nearly two years after the property had been transferred, was a statement extracted from the board in London and then only a bare outline, concealing the pertinent facts of the deal, was forthcoming.

The first notice concerning the existence of the new company was published by the *Tientsin and Peking Times* in March, 1901, reprinted from a Shanghai newspaper, which stated:

"The Kaiping Coal Mines and the railway connecting them with the main line of the Imperial Railways of North China and with the port of Chingwangtao, have been bought by an Anglo-Belgian syndicate called the Orient Company, in which King Leopold of Belgium has a large interest. The syndicate also buys the rights of the Lu-Han (Peking-Hankow Railway) together with its lines now in operation. The Chinese Engineering & Mining shares of Taels 100 are already being sought after at £25."

In this round-about manner were the China shareholders given the first inkling of the sale of the properties to the Belgian syndicate. At the second general meeting of the new company held in London, October 15, 1903, British shareholders protested against the maintenance of an office of the company in Belgium and, when the direct question was asked the chairman as to who held the debentures, whether it was the Banque d'Outremer or the Syndicat de l'Orient, he explained that the constitution of the board of directors was one-half British and one-half Belgian and that not only was one-half the share capital held on the continent but one-half the debentures also. He refused to answer the direct question as to what extent the Syndicat de l'Orient and the Banque d'Outremer were holders of debentures. This flat refusal to clear the atmosphere as to the Belgian holdings only served to strengthen the prevailing opinion that although the British were nominally in control, the Belgians held the whip hand.

Belgian Domination

From the time the Chinese Engineering & Mining Company was registered in London in December, 1900, until its amalgamation in 1912 with the Lanchow Mining Company, it was presided over by a Belgian chairman of the board and a Belgian managing director. The chairman was Colonel Albert Thys, a brilliant engineer officer of the Belgian army, who as lieutenant built the Congo Railway and was afterwards appointed president of the Congo Railway Company, one of King Leopold's key enterprises in Africa. The selection of this man from the board of the Compagnie Internationale de Orient to head the British mining company, emphasizes the political aspect of the deal and the necessity of having a Belgian official in supreme control whose loyalty to his King and patron would ensure secrecy and implicit compliance with orders from above. It is probably the only case on record where a foreign military officer of high rank acted as the chairman of the board of a British company operating an enterprise in a foreign country having such an important bearing on Empire strategy. The fact that Colonel Thys held this position for over 12 years, tells us in no uncertain manner where the financial control lay and it also tells us that the conditions which give to the Belgians this control, were beyond the power of the British Government to change. Otherwise, the Foreign Office would long before have had him ousted.

How the Belgians attempted to take over control of the property and delayed making a satisfactory statement to the Chinese shareholders is best told by Mr. Detring, in his address at the meeting of protest held in Tientsin, November 28, 1902. It follows:

According to verbal understanding, Mr. Hoover after the transfer should have retired and left the management in Mr. de Wouters' hands. But he stayed notwithstanding this undertaking at Mr. de Wouters' request, undertaking the functions of acting manager with Mr. de Wouters as his assistant. I immediately began to notice a disposition on the part of these gentlemen to act on their own initiative and to disregard the terms of transfer. I remonstrated and further I asked for a financial statement showing exactly how matters stood in London. This was promised repeatedly but did not appear. Then about June or July 1901, an inspector appointed apparently from Brussels appeared, by name Mr. Franqui, with whom I took up the matter of finance. He promised to obtain for me an official statement from Europe. In August and September came a large consignment of men, two of them were accountants from England, the remainder were engineers and nine employees from Belgium. These men were all sent out without any requisition from this end. There have been since that time far more men than vacancies as a result of the influx, with consequent expense to the company. Early in September came Mr. Dugan, engaged from America to be general manager of the company. Although up to that time the management was nominally conducted under the supervision of a China Board consisting of myself, Mr. Yen-fu and Mr. Liang (the general manager being Mr. de Wouters appointed by Mr. Hoover) it happened that a crowd of employees came from Europe to join the staff without the slightest knowledge on our part that they were coming. Almost immediately on the arrival of Mr. Dugan, the general managers, Messrs. Hoover and de Wouters left for Europe.

I summoned a meeting of the heads of departments after Mr. Dugan had time to settle down and at the meeting I read over to Mr. Dugan the conditions of the deed of transfer and asked him if he was prepared to abide by them. He was unable to assent, for the reason that I have since learnt that Mr. Franqui, who exercised supreme powers for the board in Europe, instructed him to render any action of the board of managers abortive. Thus an impossible situation was created at once. I sent for Mr. Franqui, who was then in Shanghai. He came up in November last and I demanded from him fulfillment of the conditions of transfer as well as a full financial statement as to the capital account. I should mention that the news of a debenture issue of £500,000 at 6 per cent. had reached me casually two months before this. It is usual in the case of so enormous an issue of debentures to consult the shareholders, but there had been no consultation whatever with us on the subject, nor was any prospectus or invitation for subscriptions sent to us or to the shareholders at large in China. These debentures as you know carried a bonus of £250,000 in shares, standing at from 70 to 100 per cent. premium at the date of issue. So the reason of the issue was not apparent.

I got nothing satisfactory from Mr. Franqui, but he was able to tell me that Mr. Trouet, the managing-director from Brussels had left home for China and that he would be able to set all differences at rest. Mr. Trouet arrived and spent two months here. We had several interviews with a view of adjusting differences amicably, but nothing definite came out of the visit, except that Mr. Trouet promised that having personally learnt the exact points of difference between us, he would be able to lay them clearly before his colleagues at home and obtain a settlement satisfactory to all parties. The only immediate effect of Mr. Trouet's visit was that he destroyed the authority of the general manager over his staff and settled final plans for the Chingwangtao pier, which plans were upset as soon as he returned home. So that he left things worse than he found them.

Mr. Trouet left for Europe in February (1902) and we waited patiently for the result of his representations. As time went on and nothing came, it became increasingly evident that a deliberate system of delays had been adopted from the first and that no reliance was to be placed on the promises made. Accordingly, I wrote to the solicitors of the company in July last putting the facts of the case before them and warning them that we would wait no longer, but would take action to remedy our grievances. Soon after writing this letter, I received news that a new general manager had been appointed with full power to come to an equitable settlement with us and that he would arrive in August. We once more patiently awaited the arrival of a saviour. Mr. Wynne arrived, and as he had been given liberal powers a distinct forward was possible. I think I may say that Mr. Wynne recognized freely that the old policy of silence and delay was the wrong one and that there was much justice in what we were contending for. We at once proceeded to negotiate with a view to carrying out the conditions of the transfer with regard to management of the property by a board in China. As a result of these negotiations I understand that alteration of the articles of association is in contemplation with a view to meeting our demand.

As regards the important financial question I understand from Mr. Wynne that the position is as follows: Capital £1,000,000 out of which £375,000 is allotted to Chinese shareholders; £250,000 to debenture holders and £375,000 presumably allotted to promoters. (The meeting here gave audible expressions of astonishment). We have contended that this allotment to promoters is excessive and that it cannot be justified.....

Mr. Detring's Anger

Putting down his papers, and speaking with evident emotion, Mr. Detring concluded:

"One word more. For the action that has been taken in this matter I am chiefly responsible. I have been here a long time and been an advocate of the amalgamation of Chinese and foreign interests. I have suffered for this advocacy and undergone trials for it. The present is the greatest matter of its kind. In taking advantage of the troubles of 1900 I thought I had a handle with which to assure the amalgamation of foreign and Chinese interests. That attempt has been so far a grand failure. I appeal to you all to-day to try and make it a success. Perhaps you will be able to do so."

On the face of things, the financial reorganization of the company was no easy task and took considerable time. In fact, it was nearly a year before all these difficulties were surmounted. This explains why the Chinese were maintained in ignorance of the financial status of the company until some definite statement could be placed before them. The issue of the new debentures and stock bonus naturally occasioned considerable adverse criticism in China and even Hoover telegraphed to London that such a large issue was unnecessary as the revenues from the mines under improved working conditions were ample for all purposes. It is necessary

to stress this point, as it shows that Hoover had nothing whatever to do with the financial reorganization of the company. Hoover was on the job at Tangshan and Chingwangtao, as chief engineer, attending strictly to his duties and explains why he was unable to comply with the Chinese request for a statement regarding the financial status of the company.

Hoover Absolved

Detring's admissions in the above address absolve Hoover of any connection with the financial reorganization of the company. Hoover's disregard of the terms of transfer acknowledging the right of Chang Yen-mao to continue in supreme control as director-general, consisted in his flat refusal to permit Chang and his Board to continue a practice that was diverting the profits of the enterprise into Chinese official pockets ; a very serious interference in Chinese eyes. We find from this statement that Hoover was in China when Mr. Franqui, the Belgian inspector with full powers from the board in London arrived on the scene followed by a consignment of Belgian employees who took over the key positions. Hoover's first clash with the Belgians came during this period when he opposed this violation of the transfer agreement. Hoover left China for good in September, 1901, having been on the job seven months, during which time he placed the enterprise on its feet and started it on the road to the prosperity it has since enjoyed under the new management. On his arrival in London, the board of directors, desiring to have his expert knowledge of the mines and conditions in China at their command, had the membership of the board increased to take him and de Wouters in as directors, a position he held until 1912, when the company was reorganized into the Kailan Mining Administration. His active participation in the affairs of the company from then on was limited to attending the occasional directors' meetings in London, when not absent in some other part of the world on his own business.

Real Value of Properties Disclosed

In the meantime, the political atmosphere had cleared. Peace with China had been signed and the indemnities fixed. The Russian troops, in the face of the strong coalition against them, had reluctantly released their hold on the railway and the mines and withdrawn to points outside the Great Wall, retaining possession of the railway line from Shanhaikwan northwards. The danger of the immediate confiscation of the mines as spoils of war had passed. The Chinese breathed more freely. Notwithstanding all the friction over the administrative control, the mines had prospered. Their real value under Western management had been revealed.

No More Official Graft

No sooner had the Chinese Government recovered from its fright and felt strong enough to resume its old practices, than it began to take stock of its revenues and perquisites. The huge indemnity imposed with the peace conditions, had cut a large hole in the Imperial revenues. The old juicy income from the Kaiping mines no longer came into the treasury. Instead, all the great profit over and above the dole that was handed out to the shareholders, was now being distributed abroad. The officials were peeved exceedingly. Although all were perfectly familiar with the circumstances under which the deal was made, as usual, they began to hedge. They had followed their old traditional diplomacy, playing one power against another and in the words of a British observer, had " got jolly well stung." Now, when the danger was over they wanted to go back on their bargain. The loophole to start a controversy was there. They accordingly called Chang Yen-mao to give an account of his stewardship of the properties. Chang was compelled to make public the details of the deal and confess that the power to handle the revenues as of old had been taken from him in violation of the provisions of the memorandum of transfer recognizing him as director general for life. He put up a good defence but was impeached by the censors for betraying his country and degraded in rank. In all probability, Chang would have suffered greater indignities had it not been for the hope held out by the memorandum. The Empress Dowager was " greatly distressed over this betrayal of China's sovereign rights" and in a message from the Throne declared that the old company being semi-governmental in character, its properties could not be alienated without an Imperial Mandate. In other words, that it was considered, despite its nominal private character, as a government enterprise, whose profits were relied upon to defray the maintenance of the Peiyang fleet.

A new Viceroy had come into power in the Metropolitan province. Yuan Shih-kai, " the Strong Man," creator of the modern army, and bitter enemy of Japan, ruled over North China. Yuan called Chang Yen-mao to his Yamen and told him that he must get the contract annulled or lose his head. Yuen would be satisfied with nothing less than the cancellation of the registration of the company and the full restoration of China's sovereignty. He even declared his intention publicly in January, 1903, to take over control of the Kaiping Mines and confiscate all the properties for violation of contract. In fact, he memorialized the Throne asking for permission to carry out his threat and only awaited its command to act. Chang Yen-mao also went to Peking and laid his case before the Wai Wu Pu* and demanded diplomatic support in enforcing his claims.

For two years the controversy precipitated by the protests of the China shareholders was the subject of acrimonious comment in the newspapers of London and China, the Chinese press bitterly denouncing the financial arrangements and the transfer of control to European hands while the conservative British newspapers defended the transaction.

Aside from the one letter from the British Shareholder published in the *Pall Mall Gazette*, there were very few public statements explaining the new company's position. However, Mr. Moreing himself gave an interview on February 24, 1903, to the *Westminster Gazette*, in which he said :

" It is interesting to note also that for years the old company paid dividends at the rate of £20,000 a year, which was raised to £150,000 directly it came under European control. In view of this, the native shareholders have come to realize the real value of the property, and started the agitation to know why it was sold.

" Besides this, the Chinese officials, who had plundered the company for years of this difference between £150,000 and £20,000, brought pressure to bear ; and Chang Yen-mao, Director-General of Mines for the Chinese Empire, who sold the property, was afraid to disclose the real nature of the transaction, shareholders and officials alike being kept in the dark as to the existence of the deed of sale. The shareholders were willfully deceived. Chang Yen-mao while posing as a badly used person was all the while in possession of the deed of sale, under the provisions of which he knew the whole action of the directors was unassailable.....

" It is unquestionable that until the arrival of the present general manager, the administration of the company was very defective.....

" In the past it was such a lucrative source of income to the Chinese officials that every effort is being made to recover the mines by making Chang Yen-mao repudiate his sale ; if this succeeds the shares and debentures will be worthless. The support given to Chang emboldened him as Director-General of Mines to stop development of the coal field owned by the Company and put difficulties in the way of selling coal etc."

To the British Courts

Such a controversy could have only one ending. The Empress Dowager did not dare at the time to precipitate an issue with Great Britain by resorting to repudiation of the contract and forcible confiscation of the property. The war between Russia and Japan had started in the early part of 1904, and the international political situation in North China once more placed the Chinese in a dangerous position. It was no time to invite the hostility of the British Government, so the Chinese decided as a last resort to carry the case to the British courts. Now, in all the controversy over the case, it has never been fully emphasized that the issue was one purely of administration based on the Memorandum of Transfer of February 19, 1901. It had no reference to any money question or financial reorganization. The one point at issue was the right of Chang Yen-mao to manage the properties in China under a China Board of which he was to be the Director-General for life.

Properly to equip him for the mission, he was reinstated in his official rank and invested with the Imperial authority to prosecute the case in England. In November, 1904, His Excellency Chang Yen-mao, accompanied by his adviser, Mr. Gustav Detring, now Commissioner of Customs in Tientsin, Mr. Yen-fu, another Chinese

*Ministry of Foreign Affairs.

director of the company, and a suite of officials, departed for England on a German steamer, to be on hand for the trial set for January 17, 1905, in the High Court of Equity in London.

The Decision and its Appeal

With the testimony submitted at the trial we prefer to make no comments. The reports of the trial were published in the leading London newspapers of the day and copied by the newspapers in China.

The action was brought by Chang Yen-mao against the firm of Bewick, Moreing & Company, the Chinese Engineering & Mining Company and Others, to compel the carrying out of the Memorandum of Transfer of February 19, 1901. In the trial Mr. Hoover's rôle was that of the main witness upon whose activities as agent for his principal and upon whose testimony concerning these activities, depended largely the outcome of the suit. The decision recognizing the validity of the memorandum was largely influenced by Mr. Hoover's testimony.

The Chinese asked for justice and they got it, but in summing up, the British judge paid his compliments to the litigants in the following terse words:

"In the investigation taken before me of the transaction in question, it has not been shown to me that His Excellency Chang has been guilty of any breach of faith or of any impropriety at all, which is more than I can say for some of the parties concerned."

Justice Joyce held that the Memorandum of February 10, 1901, was binding upon the defendants and that effect must be given to it. The case was then appealed and went before the Supreme Court of Judicature presided over by the Master of the Rolls, Lord Justice Romer, and his colleague, Lord Justice Cozens-Hardy. The final judgment of this court was that there was nothing *ultra vires* in the agreement and in the main the judgment of Justice Joyce was right. The effect of the declaration made by Justice Joyce was, however, to give the plaintiffs rescission of the contract which could not be rescinded except upon terms which the plaintiff was not willing to accede to. Having taken away the right of rescission, the court gave the plaintiff an enquiry as to what damage he had suffered by the company breaking the agreement in the memorandum. The court also held that the declaration of Justice Joyce was properly made against Bewick, Moreing & Company, but stayed all further proceedings.

Why Chang's Claims Could not be Paid

In other words, Chang Yen-mao established before the British courts the validity of the memorandum giving him full control over the property as Director-General in China for life, but as this memorandum contravened the law which provides that all British companies must be directed by a board elected by the shareholders in England, it could not be enforced. In his ignorance of British law, Chang had made the mistake of signing a deed of sale in July 1900, without qualification and when, after the formation of the company, he stipulated the conditions of transfer, these could not be legally carried into effect. Chang was left with a claim for damages, and the High Court of Appeals stopped all further proceedings.

It is difficult after a lapse of twenty-five years to reconstruct a case from the newspaper reports of the trial, but in view of all that we now know of both sides of the controversy, the collective indictment of the British judge seems uncalled for. Coming at the conclusion of a highly involved legal decision which still gives the layman a headache to read, the last sentence is remembered when the rest of the decision is forgotten. There is no doubt that the British and Belgian promoters resorted to sharp practice in securing control of the Chinese properties, but they pitted their wits and their money against a group of Chinese equally crafty in business. The Chinese never complained officially about the financial end of the deal. All they wanted after the debts were cleared up and new funds were in the company's treasury, was the administrative control with the powers to put into practice their system of squeeze that would have once more diverted the revenues into their pockets.

A Classical Tragic Tale

The story of the Kaiping Mines is the story of all other Chinese industrial enterprises; the story of the railways, the story of the revenues; in fact, the story that has brought China where she is to-day. For beneath all the fighting and civil war that has ruined the country, is the determined struggle to loot its revenues and exact tribute from every industrial enterprise not under foreign protection. The Kaiping deal is the one transaction where the foreigner outwitted the Chinese at their own game and barring the Fushun Collieries under Japanese control, the enterprise stands to-day as the most profitable mining venture in China, a tribute to efficient foreign management and honest supervision over finances.

Let us return to the sequence of the story. Chang Yen-mao reported gleefully from London that he had won the case in the British courts, but neither the Wai Wu Pu or Viceroy Yuan labored under any illusions about the real meaning of the verdict. The correspondence between Yuan and the Chinese Foreign Office published in the China newspapers reveals that they fully understood that the decision, while favorable on its face, in no way altered the status of the company, which remained British and subject to British company regulations. When the Court of Appeals subsequently stopped all further proceedings, the Chinese Director-General had nothing but a claim for damages with no court to enforce payment.

It should be recorded here that the attempts of the Belgians to grab the administrative countrol and swamp the enterprise with Belgian employees had aroused the resentment of the British shareholders and the British Government was finally compelled to take notice of the situation. It was all very well for a Belgian army officer to be chairman of the board and for a Belgian managing director to administer the company's affairs from London, but British prestige would never have survived the shock of having this control extended to Belgian supervision of a British enterprise in China. Aside from this, the British Government found itself in a similar predicament as the Americans in the Canton-Hankow Railway concession which had been taken over by the Belgians in the same way they secured control of the Kaiping properties. But there was a difference. The Kaiping Mines and the port of Chingwangtao were strategic keys to the military control of North China. The war between Russia and Japan was being fought in Manchuria. Great Britain was the ally of Japan. China was the secret ally of Russia* and Belgium her silent partner. At any time the Russian forces might make a circling movement through Mongolia, violate the neutrality of North China and attack Japan on her exposed western flank. Belgian control of the Kaiping Mines and its shipping port carried with it a military menace of supreme importance to the Anglo-Japanese alliance. It is significant that in 1904, during the progress of the war that a new General Manager for the Chinese Engineering & Mining Company appeared in Tientsin.

Major Nathan Take Control

This man, Major W. S. Nathan, was one of the most brilliant engineers in the British army, brother of Sir Matthew Nathan, the newly appointed Governor of Hongkong. Major Nathan was one of those upstanding, two-fisted, super-efficient types, who knew his business. He soon let the Chinese and Belgians understand who was boss. From the time of his appearance in China, the Belgians were relegated to the technical supervision of the mines with no further voice in the administration of the property. The presence of this stern military disciplinarian in North China in supreme control of a key strategic position during the Russo-Japanese war was a guarantee to the British Government and its Japanese ally, that neither the Chinese, the Russians or the Belgians could slip over anything in that region. Under his able management, the property was developed into its present immensely prosperous condition.

The Manchu Government never conceded the legitimacy of the transfer of the Kaiping properties but dared not reopen the question after the decision of the British court of appeals. The British company declined to pay the Chinese Government's and Chang Yen-mao's claims for loss of sovereignty and deprivation of

*Under the Li-Lobanoff Agreement.

a life-time job. The Chinese then began to hatch plans of revenge. They placed obstructions in the way of sinking new shafts in the basin, interfered with the surveying parties, placed an extra tax on the sale of coal and raised the freight rates on the government railways. Defeated in obtaining control of the company, the Belgians and Germans also developed a good sized grouch and combined secretly with the Chinese to keep the British from profiting too much from their virtual domination of the mining possibilities of North China. Encouraged by the Belgians and Germans, the Chinese organized a new company to develop another part of the Kaiping coal deposits, to which, under its original charter, the Chinese Engineering & Mining Company held exclusive rights. This company, officially styled the Grand Mining Company of Peiyang and Lanchow (commonly known as the Lanchow Mining Company) was, in effect, a replica of the old Kaiping company, organized under Chinese laws, managed by a Director-General appointed by the Viceroy and subsidized with official funds. It was nominally a private corporation with the bulk of the non-Chinese shares held by the same Belgian and German groups interested in the Kaiping mines. Ignoring the exclusive rights of the Kaiping Company in the basin, the new Chinese company proceeded to sink shafts and work the same deposits. This brought forth a protest and for three or four years the old controversy was revived and threshed out in the press by the advocates of both sides.

Under Major Nathan's direction, the Kaiping properties continued to prosper in spite of all the difficulties placed in his way. From 1905 to 1911, the average annual profits were £174,811 while the output jumped from 876,000 to 1,170,000 tons. It was not long however before the Lanchow mines became a formidable competitor, and by 1911, this competition became so effective that the Chinese Engineering & Mining Company was compelled to fight to save its position. Backed with a large cash reserve and unlimited credit, the British company began to reduce the selling price of coal and brought it to such a low level that the new Chinese company was forced to the wall. Things might have worked out differently had the Government retained its ability to advance funds to its own enterprise, but the Manchu dynasty was nearing its end and the treasury was empty. When the Manchus went out and Yuan stepped in as President, he was willing to compromise. The coal war ended in an agreement approved by the Chinese and British governments amalgamating both companies under one administration while preserving their corporate independence.

The Chinese justified their refusal to recognize the exclusive rights of the Chinese Engineering & Mining Company in the Kaiping basin by reason of their failure to receive justice in the old deal after the decision of the British court had been in their favor and stipulated as a condition to the new agreement, that all the old Chinese claims against the Chinese Engineering & Mining Company be paid in full. This condition was accepted in the interest of harmony and the British company obligated itself to issue new debentures to the amount of £1,200,000, out of which Taels 1,500,000 were to be paid to the Lanchow Mining Company for payment of its debts; Taels 500,000 to be reimbursed to the Peiyang Viceroy and Taels 1,000,000 to be paid to Chang Yen-mao in settlement of all his claims. The last clause of the final Kailan Agreement signed June 1, 1912, reads:

"The claims of Chang Yen-mao, of Yang San-chin (for salary and police expenses), of certain employees of the old (Chinese) Kaiping Company (for bonus), and of the Chinese Government on account of sovereign rights and other claims have been settled and accordingly the said parties to the above agreement hereby agree and declare that such settlement shall be binding on them as from the date on which the said agreement shall have become effective."

Twelve years after the original deal and memorandum of transfer and seven years after the High Court of Justice in England had decided in his favor, the claims of Chang Yen-mao and the Chinese Government were paid in full. From the legal point of view, the old controversy terminated with the new deal. Whatever differences of opinion existed up to that time as to the legality or the morality of the original transaction disappeared in the new agreement creating the Kailan Mining Administration. The slate was wiped clean. In the reorganization of the company, Mr. Hoover who had retained his seat as director up to that time, severed his official connection with the board in London. So ends the story of the Kaiping mining deal.

Hoover's Own Report on China

Since writing the above article we have discovered in our files a copy of the Report on the Kaiping Coal Mines prepared, in 1902, by Herbert C. Hoover for the Institute of Mining and Metallurgy. The paper is largely technical, descriptive of the mines and coal seams, but there are certain paragraphs on the history, operation and management of the properties which reveal something of the tremendous handicaps Hoover had to contend against in eliminating "squeeze" and fighting superstitition. In describing the founding of the company, he says:

"The company organized was of semi-official character and the Government was to participate in the profits and appoint the directorate. The capital was secured by a share issue, but the shareholders had no voice in the company, and were somewhat on the footing of debenture-holders with variable interest as the directors might decide. However, 12 per cent. was paid as a rule, and after this the officers considered that their services warranted the absorption of the remainder."

The first year under Hoover's management of the properties showed a profit of over $500,000, the second year over $600,000. Under the Chinese system, the most that had ever been distributed in dividends was $100,000. The directors pocketed the $500,000 and divided it with the Viceroy and Government officials in Peking.

In his comments on Labor and Cost of Mining, he says:

"Much has been written of the cheap labor of China, but those who have experienced its disadvantages have said but little. The simply appalling and universal dishonesty of the working classes, the racial slowness, and the low average of intelligence, gives them an efficiency far below the workmen of England and America. Neither is the Chinese working man in China to be judged by his countrymen in America, who, coming by natural selection from the best working class, are freed from a maze of custom and superstition, and imbued by the spirit of another country, which makes him unrecognizable in China. For crude labor, such as surface excavation, he has no equal, but as we proceed up the scale of skill, he falls further behind, until when we arrive at the skilled mechanic and factory operative, the productive costs with Chinese labor are as great per unit of production as in England and America..... When we consider the fact that in factory work he cannot begin to get the same work out of a machine, and correspondingly in mining he must have much ground open, the increased cost of superintendence and eternal vigilance against fraud, and general increase of administrative costs, we have many advantages of cheapness compensated. Under Chinese administration, where every deficiency of the workman is multiplied many times by the innate lack of administrative ability in his superiors and their more consummate dishonesty, we understand why the working costs on these mines have been three times what they would have been in England and America under similar conditions, and why with foreign administration, while the costs will perhaps fall below the foreign standard, it will be a result of very good management indeed. In two years these mines, with the management now installed, will prove the economic value of the cheapest labor in the world, and will be of no mean interest from the industrial standpoint.

In conclusion, he adds:

"Matters of collateral interest to those engaged in the enterprise are on a scale much above prosaic Occidental coal mining. The superstition of the miners finds many vents, and every accident is begot by some special devil and usually exorcised by fire-crackers. The lack of gas frequently reoccurs as a special blessing. The mulishness of the native miner in his refusal to accept instruction to under-cut the coal is a thing he has ever refused to embrace preferring to cut straight from the face; his capacity for thieving emphasized in a country where the division of the currency permits transactions in 1/20 of a cent, permits the abstraction of nails, screws, nuts, and even coal; his phenominal capacity for bribery and "squeeze" require constant vigilance. The disregard for human life permits cheap mining by economy in timber, and the aggrieved relatives are amply compensated by the regular payment of $30 per man lost. Cases have been proved of suicide for the amount, and other cases where six grief-stricken fathers claimed the reward for the same man."

Sun Fo's Stupendous Task

China's Railway Rehabilitation

How Sun Yat-sen Snatched Victory from Defeat and Turned His Dream Into a Practical Reality

By George Bronson Rea

IN our September number, appeared the plan for the rehabilitation, construction and improvement of the communications system of China, issued as an official document by Mr. Wong Peh-chun, Nationalist Minister of Communications. These plans were exhaustive, embracing the rehabilitation and extension of the existing railway system, (a herculean job in itself) the extension of telegraphs, long distance telephones, no less than 78 wireless stations, together with the establishment of Government radio manufacturing plants, shipbuilding, locomotive, car, and steel works, aviation fields, highways, waterways, steamship lines and other related developments. Although an estimate of cost was not included in the report, the total is obviously enormous, utterly beyond the power of China to defray for many decades to come.

Before we had time to digest and comment on Minister Wong's plans, the new Nationalist scheme of government went into effect. In this government, the portfolio of Railways is held by Mr. Sun Fo, the distinguished son of China's great Patriot and Teacher, the late Dr. Sun Yat-sen. Mr. Sun Fo recently returned from a protracted tour of Europe and the United States where he discussed informally with bankers and government officials the possibility of enlisting foreign aid in financing the reconstruction schemes of his government. The mantle of Dr. Sun has fallen upon his son. If he is to succeed, even in part, he must adhere religiously to the same rigid principles of honesty and common-sense that characterized his father's handling of the same problems. Conditions have changed since Dr. Sun Yat-sen startled the world with his plans for the international development of his country. At that time, Dr. Sun had the advantage of a national credit and foreign confidence in China's stability and integrity that would have enabled him to raise the initial sums required to carry out his plans. Sun Fo is handicapped at the very outset of his task by an utter collapse of China's credit abroad and a lack of confidence in her willingness and ability to liquidate outstanding obligations and provide guarantees and security for future investments of capital. It may be good domestic politics and excusable propaganda to stir the imagination of the Chinese people at this time with pen pictures of their country's future greatness, but when these schemes are itemized with corresponding estimates of cost, the total is so vast as to create a mental vertigo and reservation in the minds of foreign observers as to the rationality of those responsible for such publicity.

For, following almost immediately after the publication of Mr. Wong Peh-chun's rehabilitation plans, comes the announcement in the Chinese press of Mr. Sun Fo's reconstruction schemes, which alone total some twenty-five billion silver dollars. To finance this vast program it is proposed to raise each year from abroad the sum of $200,000,000, another $200,000,000 from Government revenues (which at present do not exist) and a further $100,000,000 from an internal reconstruction loan. Even at this rate, it would take fifty years of steady financing and uninterrupted stability to complete the projects, a dream that could be realized only if China is stabilized under a strong central government exerting control over the entire country and its revenues and enjoying an established credit abroad enabling her to compete in the financial markets of the world for the annual instalments of $100,000,000 in gold loans required. For a government struggling to solidify its position, with a precarious control over the revenues of only five provinces, seriously to advance a reconstruction program calling for an annual investment of $500,000,000 silver over a period of fifty years, is either an indication of its failure to grasp the rudiments of practical affairs, or a vain piece of propaganda designed for home consumption. It is perhaps only fair to state that Mr. Sun Fo's scheme is based on his father's program as outlined in his "International Development of China," with a rough estimate of costs attached. It means nothing more than an announcement that, as far as possible, the general plan of Sun Yat-sen will be followed by future Chinese governments. It may be taken for granted that in working out his reconstruction plans, Minister Sun Fo will confine himself to the realities of the situation and concentrate his energies to practical railway projects that stand some chance of being carried out.

Sun Fo, Minister of Railways

The cost of rehabilitating China's existing railway system must come from within. It is futile to expect foreigners to subscribe to further loans to rehabilitate lines their money has created and on which the interest has been defaulted. No sensible investor will hazard further capital to re-equip railways whose direction, operation and revenues have been taken over by military satraps in temporary control over the regions traversed by these lines. As long as military commanders continue to loot the Peking-Hankow line of $500,000 a month, pocket the revenues of the Lung-Hai line and await the evacuation of Shantung by the Japanese in order to take over the Shantung Railway; as long as another militarist diverts the revenues of the northern section of the Peiping-Mukden and Chinese lines in Manchuria into his treasury and retains in his possession the major part of the rolling stock of other northern railways; as long as still another collects the receipts of the Peiping-Suiyuan and the Shansi Railways and another holds the southern section of the Peiping-Mukden line, while other minor satraps refuse to surrender to the Nationalist Government the revenues of the railways under their control, no foreign money will be forthcoming for rehabilitation purposes.

There is a possibility that under given conditions, foreign assistance might be enlisted in the financing and construction of an entirely new scheme of railways properly safeguarded with essential guarantees for the supervision of expenditures and control of operation, but this possibility is predicated upon the restoration of foreign confidence in China's willingness and intention to pay her outstanding obligations. This confidence, can be established only by the immediate surrender of the existing railway lines and their revenues to the ministry responsible for their operation. A debtor, no matter how badly he may be hit, can always obtain further financial assistance if he inspires confidence in his ability, integrity and determination to help himself. The chances of raising capital abroad for any new railway construction program in China will be immeasurably improved if the Chinese through their own efforts evince a determination to rehabilitate existing lines, resume suspended payments of interest and settle outstanding indebtedness for materials supplied.

This can be accomplished only by restoring control over the existing railways to the Ministry responsible for their operation. When the traffic and commerce of the interior is once more circulating freely over the railways, the government's revenues will increase by leaps and bounds all along the line. It is folly to rely on an increase of customs revenues to defray the urgent expenses of government when the military leaders in control of the railways throttle the trade of the nation. If foreign governments are to recognize China's tariff autonomy and consent to the levying of increased duties while the military overlords continue to monopolize the railways and their revenues for military purposes, the concession of tariff autonomy will bring no permanent relief to the country.

Somebody must set an example in patriotism and self-denial. Some one of the military overlords must follow the precedent created by Sun Yat-sen in eliminating himself for the welfare of the nation. Here is a brilliant opportunity for Feng Yu-hsiang to distinguish himself and live up to the reputation he has been at great pains to build up through his frugality, contempt for pomp, and blunt honesty in governmental affairs. Feng is Minister of War in the new Nationalist Government and as much responsible for its success or failure as the more enthusiastic and immediate followers of Sun Yat-sen. He controls the major part of the railways throughout North China, outside of Manchuria. It is his duty to set an example that will strengthen the government of which he is such an important member, restore faith and confidence in China's integrity and make easier and possible the tremendous task of rehabilitation and reconstruction.

It sounds and looks well for the tuchuns to render lip service to the principles laid down by Dr. Sun Yat-sen for the salvation of China, but they ignore the outstanding truth that these principles rest firmly on a spirit of patriotic self-sacrifice, loyalty and honesty. Sun Yat-sen set the example for his countrymen to follow. Now that his son is called upon to carry forward the plans he renounced the presidency to carry out, it is well to review briefly, just what Dr. Sun did accomplish. The full story of Dr. Sun's railway activities has never been told. Some day, an authoritative review of these activities may be written. At this time, it is sufficient to emphasize and invite attention to the fact that he created a standard of official honesty and administrative integrity that must be adhered to by those who are now governing China under the provision of his will, if they are to restore China to her high place amongst the nations of the world.

Dr. Sun's dream was the development of China into a great and powerful nation, criss-crossed with a net-work of trunk railways carrying the products and commerce of his country to central ports on the coast under exclusive Chinese control and jurisdiction. He surrendered the presidency of the Republic of China to Yuan Shih-kai in order to devote himself to the realization of his dreams. Sun Yat-sen was not forced out. His renouncement of power stands in history as one of the greatest personal sacrifices ever chronicled of a patriotic leader who voluntarily effaced himself in order to stop further civil war and bloodshed and bring upon his country the blessings of peace.

Yuan, and his henchmen in Peking, with a fuller knowledge of China's secret treaties, knew that Sun's railway ideas could never be carried out; they knew that China was bound hand and foot by secret and other commitments which handed over a practical monopoly of railway construction to foreign powers and, when Yuan signed the document authorizing "Sun Wen" to organize a Chinese National Railway Corporation for the financing and construction of a national system of railways, he did so in the full hope and confidence that Sun would be discredited, eliminated from politics and destroyed as a rival. Peking laughed at the joke perpetrated upon Sun.

Dr. Sun reposed such confidence in Yuan that it took some time and a careful study of the documentary evidence before he became convinced that Yuan had double-crossed him. When he finally realized what he was up against, he was big and honest enough to acknowledge his position. He met the situation by devising an entirely new and practical scheme of railway construction, embracing some 10,000 miles of essential trunk lines absolutely free from international politics or the possibility of foreign interference or protest. Yuan's plot to ridicule and ruin his rival, failed. When the Second Revolution was precipitated by Yuan's treachery, in July 1913, Dr. Sun had formally signed on July 4, an agreement for the construction of the Canton-Chengtu Railway (over 1,000 miles in length) and his Deputy in Europe had arranged with other financiers and contracting firms for the building of 4,000 more miles on the same terms. Dr. Sun's railway powers were annulled by Yuan on July 18, 1913, the very day that the detailed contract for the Canton-Chengtu Line arrived in London, where it was awaited to serve as the basis for signing further contracts, totalling 4,000 miles of new lines. Had the Second Revolution been delayed another two weeks, Dr. Sun's scheme would have gone through while his powers were legal and valid. His original railway scheme was a dream; in its modified form it was sound and financially practical. The contract between Dr. Sun Yat-sen and the British firm of Pauling and Company still stands in the history of railway financing as a testimonial to clean and honorable negotiation on both sides. Dr. Sun received from Pauling & Company, the lowest terms ever conceded by international finance for the construction of a railway in a foreign country. The contract created a new precedent in Chinese railway financing. It broke the power of the official financial groups designated to carry out the policies of their respective governments and paved the way for further benefits to China.

Dr. Sun Yat-sen's railway activities did not fail because of any inherent weakness in the scheme itself. It owed its failure, in the first place to the enthusiasm of his American Deputy, entrusted with the delicate task of carrying through the preliminary negotiations. When Dr. Sun's scheme was laid before Sir Charles Addis, head of the Hongkong & Shanghai Banking Corporation in London, leader of the Official British Group and Sir Charles became satisfied with the legality and validity of Sun's powers and those of his Deputy, he said that "*he would take over and finance every mile of railway that Dr. Sun would contract for.*" At this juncture, Dr. Sun's Deputy received a telegram from the late Willard Straight, appealing to his Americanism and urging him to bring the scheme to New York and give the American Group the privilege and prestige of signing the preliminary agreement. Dr. Sun's deputy, anxious to give his own country this distinction, departed hurriedly from London for New York, only to find on arrival that owing to the uncertainty over Wilson's foreign policies, the American Group would do nothing until he was inaugurated and his views on China definitely ascertained. Two weeks after Wilson assumed office, he withdrew official support to the American Group in the matter of the Reorganization Loan and declined to modify his policy in order to permit American capital to co-operate with the other Groups in the financing and construction of Chinese railways. Had Dr. Sun's deputy remained in London and concluded the preliminary contract with the British Group, the entire scheme would have been taken up and the funds raised to ensure its success. This original defeat was partially overcome by breaking the scheme into its component lines and contracting with individual British and French firms for their construction. With the signing of the Pauling contract and success once more in sight, came the outbreak of the Second Revolution and the annulment of Dr. Sun's powers.

This, in brief, is the history of Dr. Sun Yat-sen's railway scheme; a tribute to his far-sightedness and common sense in the handling and solution of practical affairs. That he failed was no fault of his own. Honest, sincere and patriotic, motivated solely by a high-minded desire to benefit his country, Dr. Sun created a precedent in Chinese railway financing, absolutely free from the slightest taint of graft, squeeze or corruption; a meritorious performance of official duty that should be inculcated in the minds of the Chinese people and their leaders as a standard that must be lived up to, if they are to win ont in their fight to implant his other ideals in their political system.

(Continued on page 500).

Japan's Quest for Iron

Where Will China Get Her Future Supply ?

IN the race for industrial power, Japan is handicapped by a scarcity of iron and to supply this deficiency has turned to every country in Asia and Australasia for her growing requirements. For many years, she sought to find this supply in China and has spent perhaps Y.100,000,000 in acquiring iron mines and blast furnaces in this country. The fact has been gradually forced upon Japan that China can never furnish her with sufficient iron, simply because she has too little for herself. According to Mr. K. L. Hsuieh in a recent issue of the "Chinese Economic Journal," about 90 per cent. of the known iron resources of China have passed under Japanese control. Ten years ago, this feverish quest for iron on the part of Japan, alarmed even the United States who saw in Japan's activities, preparations for war in the Pacific. Chinese orators and writers still fulminate against Japan's loans to the Han-Yeh-Ping Company and periodically create an agitation to prevent her from collecting or taking over direction of the properties in order to make them pay. It is now quite possible that that the Y.45,000,000 already advanced to this premier Chinese industrial concern by the Yokohama Specie Bank over a period of 18 years, will never be repaid, nor will China ever live up to the contract to furnish the tonnage of ore stipulated in the loan agreements. Japan's quest for iron in China has been a dismal failure and for many years she has been seeking her supplies from other sources.

The exportation of Indian pig to Japan at rates lower than those prevailing in India, has materially assisted the infant Indian iron and steel industry to maintain itself on a profitable producing basis. But even this supply is insufficient to meet the ever growing demands for cheap raw material for the Japanese steel mills. Some idea of what China has lost is seen in the closing of a recent contract between a group of Japanese manufacturers and the Australian Iron & Steel, Ltd., in which Japan agrees to take 150,000 tons of ore the first year, 300,000 tons the second year, 500,000 tons the third year and thereafter progressively until the total reaches 1,000,000 tons a year. The agreement being for 12 years, it would make the total contract about 10,000,000 tons. The placing of this order in China through the Han-Yeh Ping Company would have spelled prosperity for the company and work at good wages for thousands of unemployed in the Tayeh district. China's loss is Australia's gain. The Australian deposits at Yampi Sound on the northwest coast of Western Australia, contain some of the purest iron in the world and there are over 100,000,000 tons available on the side of a hill by simple quarrying. Docks are to be built at the foot of the hill and the ore will be shot by gravity direct from the workings into the holds of the steamers. Within a month after closing the above deal, comes the further announcement that the Japanese are negotiating with the New Zealand authorities for the purchase of an iron mine capable of producing all of Japan's iron requirements for may years to come.

Foster Bain, the eminent American mining authority, in his exhaustive study of the coal and iron resources of the Far East, issued last year by the Foreign Policy Association of New York, emphasized clearly that neither China or Japan, could ever hope to build up a modern industrial civilization based on iron and steel and become a menace to Europe and America, simply because they lacked the essential supplies of raw material upon which such a civilization must be founded.

China has relied upon her unlimited resources of cheap labor to overcome outside competition and hold her own when she got ready to undertake her industrial development, but while she is dreaming about her future, the march of modern engineering is teaching the rest of the world that production costs in the future will be determined entirely by skilled mechanics and not by brute labor. When China gets ready to enter the race, she will find that her neighbors have out-distanced her by the application of modern methods which will make impossible any competition from her masses of unskilled, undisciplined and poorly paid labor. While China fights and dreams of her future, Japan is scouring the Seven Seas for available sources of iron to maintain her growing industries, and, unless China discovers in the Altais or some other inaccessible place within her own borders, new supplies of rich iron ore, she can kiss good-bye to her present dreams of erecting great iron and steel mills, locomotive and car works and industrial plants designed to supply her own requirements in the reconstruction and development of her resources.

Sun Fo's Stupendous Task

(Continued from page 493).

Minister Sun Fo can do nothing to carry forward his reconstruction plans without the whole-hearted co-operation of his colleagues and those members of the Nationalist Government who hold position and wield power by reason of their command over large military forces. These military leaders are also faced with a serious problem. The disbandment of their forces in most cases, means the loss of their influence. Disbandment cannot safely be carried out without the wherewithal to pay the troops. It is a vicious circle which can be broken only by stern action and a supreme sacrifice of self for the good of the country. Either the armies of China must go or the Chinese must work out their own salvation and reconstruct their country without foreign financial assistance. No progress is possible until the railways are brought under the supreme control of the Minister of Railways, even though in the subsequent allocation and distribution of the revenues, the lion's share for some time to come, goes to the military leaders. The fundamental principle of civil authority must be accepted and put into practice. This is the first step towards the rehabilitation of the existing railways and a restoration of China's credit abroad. With each further step forward in extending the civil authority ; with each sign of progress towards the ultimate goal of representative government, foreign confidence in the good intentions of the new régime will wax stronger and the way paved for the influx of new loans that will usher in reconstruction and a new era for China.

Japanese Air Brake Makers Active !

The policy of the Department of Railways is to buy domestic materials as much as possible, and recently has been buying considerable quantities from Nippon Air Brake Company, Mitsubishi, etc. In Japan there are only a few makers in this line at present and there is practically no competition in government tenders. At present Westinghouse, G.E., etc. are getting a fair share of this business, but in future preference will be given to domestic products, Air brakes of the Nippon Air Brake Company are manufactured according to the model of Westinghouse and the quality is equal to the imported products. ("Kogyo Shimbun").

Mackay Radio Corporation Seeks P. I. Franchise

The Mackay Radio and Telegraph Company, of New York, has recently taken formal steps to obtain a license from the Philippine government to install and operate super-powerful radio communications with the United States and through its connections with the rest of the world. The company desires a fifty year franchise. It is understood that the Mackay Company desires to erect and maintain a chain of wireless stations across the Pacific ocean and to provide the necessary communication service between the Philippines and the United States. Stations are to be erected at intermediate points in order to insure rapid communications and to provide continuous and uninterrupted connections.

It is believed that the rapid economic development of the Philippines during the past few years has created an increasing demand for faster, more efficient and reliable communication service between the Philippines and the outside world. At the present time no one is able to forecast the success of the company in obtaining its franchise.

The Development of Manchuria

The South Manchuria Railway Company Invites Foreign Capital to Share in its Subsidiaries, Guaranteeing a Profitable Return on the Investment and Protection to Lives and Properties

FOREMOST in development work for the coming year in the Far East is the South Manchuria Railway with its budget estimates of Y. 49,600,000, an increase of Y. 13,600,000 over the previous year's expenditures. Some idea of the extensive activities of this Japanese enterprise, can be gathered from the following itemization of the above estimates ;

Railway Department	...Y.16,300,000
Railway Workshop (Shakako and Liaoyang)	260,000
Harbor	8,300,000
Mining	6,700,000
Oil Shale Industry	2,000,000
Iron Manufacturing	4,200,000
Land	2,800,000
Miscellaneous	4,000,000
Reserve fund	5,000,000

Some of the more important items under the above heads are :

Railway

Double Tracking costs (continued)	Y.1,000,000
Rail Replacement (continued)	2,500,000
Rail Track improvement (continued)	1,300,000
New building for Kaiyuan Station (continued) ...	600,000
For construction of automatic signals (between Tashihchiao and Liaoyang)...	600,000
Equipments for Yingkou Wharves	300,000
Rail motor cars	230,000
New goods cars and reconstruction of goods cars (470 in number converted on 30 ton car basis)... ...	3,800,000

To the above are added the construction and repair of telephone lines, installation of automatic telephones, erection of goods sheds at Liaoyang and Tashihchiao, building of over-bridges at Anshan and Haicheng.

Harbor

Kanchingtzu coal pier construction (continued) ...	4,000,000
New warehouses on Dairen Wharves	1,000,000

Besides reclamation of Russia-machi and Shokoshi Shore front (continued) and completion of berth on Fourth Wharf.

Mining

New blast-furnace for increasing the output of pig iron to the total amount of 400,000 tons at Anzan Iron & Steel Works and Supplementing of other requisites.

Open cut mining installations	Y.4,000,000

Miscellaneous

Building of new dwellings	Y.1,600,000
Erection of wharehouse for stores on Dairen Wharves...	1,500,000

Estimate of Business Receipts and Expenditures

Receipts	Y.247,000,000
Expenditure	211,000,000
Balance	36,000,000

Estimate Receipts

Railway	...Y.122,000,000
Harbor	10,000,000
Mining	92,000,000
Steel manufacturing	10,000,000
Land	6,000,000
Interest account	4,500,000
Miscellaneous	1,300,000

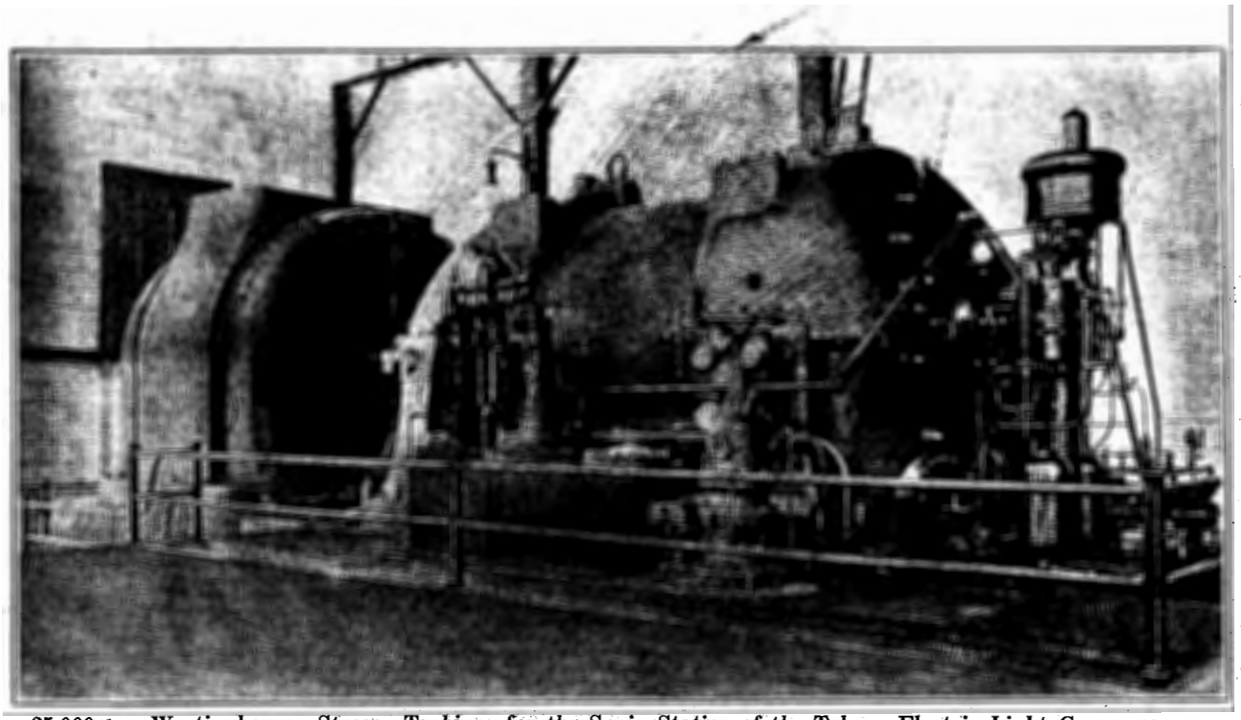
The estimated receipts for the next fiscal year, compared with the current year's, are placed at Y.4,500,000 more. They will be submitted to the Finance Ministry early in November.

One of the most important features of the S. M. R.'s activities is the program for double-tracking the entire line from Dairen to Changchun, thus making it the only double-track railway in this part of the world. The program was initiated to facilitate the transport of coal between Fushun and Dairen but owing to the phenomenal increase in the volume of bean shipments it has been extended to the entire line. To date, the line has been double-tracked as far as Ssupingkai and work is now being pushed forward northwards over the last section to Changchun. The sum of Y.1,300,000 has been set aside for this item during the next fiscal year. The old 60 and 80 pound rails are being replaced with 100 pounders and heavier bridging and other engineering work is involved to meet the increased weight of trains. At present, these heavy trains are confined to the section between Mukden and Dairen, but with the completion of the double-track system and installation of heavier bridges on the section to the north, the service will be extended to cover the entire line. This will enable the S.M.R. to keep pace with the ever increasing demands upon its capacity and increase its traffic receipts accordingly.

Naturally, the S. M. R. is endeavoring to build its bridges and rolling stock as far as possible at its own works at Shakako, but some of the business has been placed as a matter of policy with the larger Japanese locomotive and car builders. The Shakako Railway Shops are experiencing a busy time filling the orders for the line. For the current fiscal year, 19 new locomotives are to be built, of which six are passenger locomotives of the "Percival" type and thirteen are freight locomotives of the "Mikado" type. In the distribution of these orders, the Shakako Works are to build six locomotives each of the above types ; three of the freight locomotives are to be built by the Kawasaki Dockyard and four by the Nagoya Railway Car Manufacturing Company. According to the "Manchuria Daily News," the estimates of cost for building these locomotives at Shakako, is Y. 97,000 per unit or a total of Y. 1,164,000 for the twelve, while the locos built by the Nagoya and Kawasaki Works will cost Y. 131,000 each or Y. 917,000 for the seven ordered. The higher costs of manufacturing in Japan is ascribed to the business tax in that country, added to customs duty, interest, dividends, shipping and trial run costs. The per ton estimates of the Shakako Works for these locomotives compares favorably with the costs of the narrow-gauge locomotives turned out by the workshops of the Imperial Japanese Government Railways. In addition, to the above, the Shakako Works are building four passenger locomotives for the Chinese Ssupingkai-Taonan line to be completed within the coming year. This was part of the order for twelve locomotives, placed by this line some months ago, when the contract for the remaining eight went to the Skoda Works.

Another highly important engineering work is being carried out by the South Manchuria Railway across the bay from Dairen

(Continued on page 510).



25,000 kw. Westinghouse Steam Turbine for the Senju Station of the Tokyo Electric Light Company

The Development of Manchuria

(Continued from page 504)

at Kanchingtzu, where new coal storage and loading wharves are being built to handle the enormous export and bunker trade from the Fushun mines, whose annual output is now over 9,000,000 tons, The new coal wharves are to be eight and a half kilometers in length, with a coal storage depôt having a capacity of 400,000 tons. The first stage of the construction program is expected to be completed by May, 1930, when steamers can bunker alongside the wharves in much more rapid time and more economically than is now possible at Dairen, where all available storage space will be needed for the heavy annual increase in bean shipments.

Commenting on the new estimates and construction program, Vice-President Matsuoka says that they are singularly free from any motive to increase the earning capacity of any one enterprise at the expense of another. The reason for the increase in the budget this year is due largely to the construction of the Kanchingtzu coal pier and double-tracking the rest of the main line. Expenses have been cut down to a minimum for all unproductive items, so as to allow sufficient funds for productive enterprises.

The new estimates are indicative of the S. M. R.'s new policy to cut adrift from its subsidiary enterprises and to make each self-supporting by rigid economy and improved supervision. For this purpose, the staff of each unit of these enterprises has been re-organized. The Anshan Iron & Steel Works which has hitherto been operated at a heavy annual loss, is expected under new management and methods, to bring in over a million yen profit the next fiscal year. Experts of the S. M. R. have been sent to Germany to conduct the investigations leading up to the founding of a nitrogen manure industry. Steel manufacture at Anshan and the manufacture of paraffine at Fushun are now under study and a draft plan for the establishment of a Guarantee Trust Company with Y. 100,000,000 capital, chiefly for the benefit of the Chinese is before the Finance Minister at Tokyo awaiting his approval. The new trust company expects to commence business nextmonth.

The erection of plant for the distillation of oil from shale at Fushun is progressing. The reinforced concrete frame of the new furnace and its foundation has been completed and the cylinder is now in course of construction. The plant is expected to be completed by July, 1929. A company with a capital of Y. 5,000,000 fully paid up, is to be organized for the manufacture of soda-ash, in which all the shares will be subscribed for by the S. M. R. but open to the public for participation. The soda-ash demand in Japan is 120,000 tons, of which only 20,000 tons are produced in the country. The Leased Territory is ideally situated for the manufacture of this basic product, being provided with an ample salt supply, fuel and water. A plant having an annual capacity of 50,000 tons is to be erected by the new enterprise.

The Anshan Iron & Steel Works having a present capacity of 300,000 tons of pig iron, is to be enlarged by the addition of another blast furnace that will increase its output to 400,000 tons. The plans contemplate the exporting of 160,000 tons of pig to Japan and to roll the balance of 240,000 tons into steel bars and sheets. In carrying out this new development, considerable opposition arose from the Japanese steel manufacturers, but an understanding having been reached, the new steel making enterprise will be at once started.

In order to carry out its fundamental policy of adhering to the Open Door, the S. M. R. has announced its intention to throw open its subsidiary enterprises to foreign investors on a fifty-fifty basis and guarantee the shareholders an annual return on their capital of eight per cent. and the necessary protection to lives and properties.

The immediate plans call for the organization into separate companies of the Iron & Steel Works, the Soda-Ash enterprise, the Ceramic Works and later on, even the profitable Fushun Collieries with their valuable subsidiaries will be detached. In addition, there are various forestry, mining, stock-raising and agricultural enterprises suitable for Sino-Japanese joint enterprise in which the Chinese will be encouraged to participate through the new investment and trust company.

In other words, the S. M. R. is prepared to sell a half interest to foreign investors in every going subsidiary of the company and guarantee the security that is now lacking in other parts of China. It is a fitting answer to the campaign that has been waged against the use of American money in Manchurian enterprises in co-operation with Japan. It indicates that Japan is determined to protect at all hazards the vast enterprises created by her initiative and capital in that territory.

SHANGHAI-HANGCHOW BUSES.—The bus line connecting Shanghai and Hangchow *via* Haining, Pinhu, Haiyien, and Minghong is practically completed.

NEW 'PHONE LINE IN KWANGTUNG.—A long-distance telephone line in the northern part of Kwangtung province *via* Lohchang, Shaokwan and Pingshih is near completion.

MOTOR BUS SERVICE FOR KAOYU, KIANGSU.—A regular motor bus service is operating between Kaoyu and Paoyin, Kiangsu province, on a newly built motor road about 120 *li* long.

NAIGAI WATA, (Naigai Cotton Co., Ltd.), To Electrify Mills.—This company has plans to electrify its mills, to replace steam boilers. For the purpose about 20 motors will be bought, capacity ranging from 5 h.p. to 175 h.p.

NEW BUS COMPANY OF SOOCHOW.—A bus company for Soochow has been organized and has petitioned the local authorities for license to conduct a bus service. It has offered $30,000 for road improvement. The company has been promoted by Yen Hsin-fang.

NEW MILL; Kikui Spinning Co., Ltd.—The company has decided to increase its capital from Y.4,000,000 to Y.6,000,000. The funds will be used for the construction of Otaka Mill in Mikawa, and for extensions at the Yoneno Mill. The first call on new shares will be made on November 1, at the rate of Y.12.50 a share on 40,000 shares. (This is also a subsidiary of Toyo Menko K.K. controlled by Mitsui interests).

HONAN MOTOR ROAD.—By instructions from General Feng Yu-hsiang, a motor road connecting Lingpao with Tungkwan, Shensi province, will be constructed. It has been decided to employ a number of surveyors to map out the exact course of the road and ascertain the approximate amount of money needed to purchase the land from the farmers. According to an estimate of the Highway Commission, the construction will cost $370,000.

HAMURO CAST STEEL WORKS.—The Hamuro Chukojo of Osaka is planning to manufacture of special steels. At present there are only a few concerns in Japan manufacturing special steels, including the Yawata Iron Works, Nippon Tokushuko Goshi Kaisha and Ohana Kogu K.K.; the greater part of the country's requirements being imported. It is reported that estimates for the necessary equipment have been given and the plan is likely to materialize before long. This concern is located at 252, 1-chome, Tonmabashi Nishi Suji, Kita Ku, Osaka.

MUSASHI CENTRAL ELECTRIC RAILWAY CO., LTD.—Preparations are being made for establishing a new electric railway company, to be known by the above name. Promoters include Raita Fujiyama, Takamasa Ogura, Takaroku Yamanari, Gunshiro Mechizuki, Seiichi Kajima, Chokuro Kadono, Mr. Fujiyama being the chairman of the organization committee. The company is to be capitalized at Y.7,000,000. It expects to buy the Hachioji Denki Tetsudo K.K. (Hachioji Electric Railway Co., Ltd.), capitalized at Y.1,000,000, and in addition will construct new lines from Tachikawa, to Omiya *via* Tokorozawa, 32 miles.

PEIPING-TIENTSIN CANAL TO BE DEEPENED.—To relieve traffic congestion on the Peiping-Tientsin section of the Peking-Mukden Railway, Peiping (Peking) authorities are making plans to deepen the canal between Peiping and Tientsin so as to make it navigable to steam launches and heavy laden junks.

AUTOMATIC LOOMS, JAPAN SPINNING CO.—The (Japan Spinning Co., Ltd.) will remove the existing weaving equipment of the Ogaki Mill (in Gifu Prefecture)—consisting of 2,000 looms—to the company's Tsingtou Mill, replacing it by 2,000 units of the new Nogami's automatic looms. The company is also considering extensions of the automatic loom equipment at the Ichinomiya Mill.

SPINNING COMPANIES IN CHINA.—According to a recent investigation, there are 92 spinning companies in China, of which 73 companies are operated by Chinese interests (2,096,000 spindles), 21 companies by Japanese (1,392,000 spindles), and two companies by British (205,000 spindles), total number of spindles being 3,693,000. The number of operatives in Chinese companies is 134,700, that in Japanese companies 80,700, and in British companies 16,500, total 231,900.

ALUMINUM ALLOY FOR ENGINE MATERIAL.—The consumption of aluminum in Japan is steadily increasing and researches are being made for using (aluminum) alloy for manufacturing motor cars, launches, torpedo boats and other high speed vessels and locomotives. The Niigata Engineering Works, Ltd.—has succeeded in producing a motive power unit of 150 h.p. by using light alloy. The weight of this new machine is reduced to four tons from the usual nine tons.

TAIHEI CEMENT CO., LTD.—Preparations are being made for the establishment of this company, with a capital of Y.5,000,000. Of the total number of shares, 100,000, 80 thousand will be allocated among promoters and their friends and the balance of 20 thousand for public subscription. According to the prospectus the mill will be constructed at Tokuura, in Oita Prefecture, Kyushu, at an estimated cost of Y.2,000,000. The company will specialize in high class cement. The cost of production is estimated at Y.2.10 per barrel, wdich is comparatively low, as the lime mine is located near the mill site. The company expects to manufacture 840,000 barrels, on which a profit of Y.804,000 is estimated: Income, Y.3,108,000 at Y.3.70 a barrel; expenditure Y.2,304,000 including depreciation.

LARGE EXPANSION OF MANUFACTURING UNITS FORECASTED.—Filipino and American capital is to be expended in the capitalization of some 16 new centrals which will be scattered throughout the sugar districts of the islands. This will be a fairly large boost to the sugar industry of the Philippines and will provide work for a large number of native people and will utilize areas suitable for cane production. A report recently issued by the bureau of commerce and industry states that the new centrals will have a daily capacity averaging 500 to 2,000 tons of cane per unit. Seven of the new plants are to be erected on the island of Luzon; five in the central provinces and two in the Ilocos province. In the Visayan Islands three will be built on the island of Panay. Two units will be erected on the island of Negros and one on the island of Mindanao.

The Pampanga Sugar Mill, probably the largest sugar central now in operation in the Philippines is being improved so as to increase its capacity to about 4,000 tons of cane; present capacity is around 3,000 tons of cane per day. In addition it is rumored that plans are under way for the erection of a 200-ton mill at Iloilo.

IWAKI SEASIDE TRAMWAY CO., LTD.—This company is planning the electrification of its tramway lines, four miles between Konahama and Izumi to be the first section to be electrified. The cost is estimated at Y.250,000. The section between Ena and Konahoma will be electrified on completion of the first section. It is reported that Kuhara Shoji K.K. (Kuhara Trading Co., Ltd.)—a subsidiary of Kuhara Kogyo—will back the scheme. At present this company is operating gasoline locomotives. Office: Konahama Machi, Ishiki Gun, Fukushima Prefecture.

NEW RAILWAYS IN NORTH MANCHURIA.—Three new railways are projected for North Manchuria. The first is 540 *li* long, from Tungping to Mishan, passing Fangcheng, Muling and Poli. Construction will take two years and the cost is estimated at $25,000,000. The second starts from Hailin a station on the C.E.R., and terminates at Tungkingcheng, a distance of 150 *li*. Work has already been started, the capital of $1,500,000 being jointly supplied by the people of Hailin and Tungkingcheng. Construction will take one and a half years. As the completion of this line will greatly increase its business, the C.E.R. has consented to supply materials and rails at a very low cost. The third railway is entirely financed by the people of Keilungkiang province, and is the 250 *li* line from Tsitsihar to Koshan, estimated to cost $5,000,000. There will be 12 stations each 21 *li* apart. Construction will take about two years.

WATER POWER DEVELOPMENT PLANNED IN KARAFUTO.—Development of hydro-electric power is being planned on the west coast of Karafuto by a Madame Chiyo Yamaguchi who is the president of the Nanka Takushoku K.K. (South Karafuto Development Co., Ltd.) and of the Karafuto Yodo Goshi Kaisha. The plan is to utilize water of the Hishitoma and Tofutsu Rivers, to generate 500 k.w. at the former and 2,200 k.w. at the latter points.

The new company to be established will be capitalized at Y.5,000,000 and will be known as the Karafuto Suiryoku Denki K.K. (Karafuto Hydro-Electric Co., Ltd.) On the west coast of Karafuto the rate of charges for electric light and power is extremely high. The only supplier in this district, the Hokkai Suiryosku Denki K.K. (Hokkai Hydro-Electric Co., Ltd.) is buying surplus power from the steam power station of the Karafuto Kogyo K.K. (paper manufacturers) and is charging Y.1.20 to 1.30 per light of 10 candle power. Promoters of the company believe that the cost of power generation will be 4 sen a k.w.h., compared with 6 sen sales price of Karafuto Kogyo.

This is the first water power development ever planned in Karafuto.

SUPPLY ELECTRIC POWER TO PORT ARTHUR.—The plan to transmit electric power from Dairen to Port Arthur requires the total costs of Y.400,000 comprising Y.300,000 for constructing the transmitting lines, Y.60,000 for building the transforming station at Port Arthur, and Y.40,000, for the alteration of the Lungwangtang transforming station and the equipments of the Port Arthur station.

The above appropriation has been asked for in next year's Kwantung Government Budget.

The present transforming station, Port Arthur, stands in need of an additional generator of 1,500 kilowatts at the outlay of Y.130,000 to reinforce the existing one in the course of a few years, not to say of a positive inadequacy of the power capacity, as matters stand, to meet further domestic needs other than lighting, and irrigation, drainage, and rice cleaning, and other wants.

Besides, the existing generator will have to be supplanted with a new one that will cost Y.120,000.

In the face of all these, the idea to obtain the entire supply from Dairen has been mooted as far safer and more dependable even at the outlay of Y.400,000 as stated at the outset. The public at large is in favor of this plan.

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BRITISH POLICY IN CHINA

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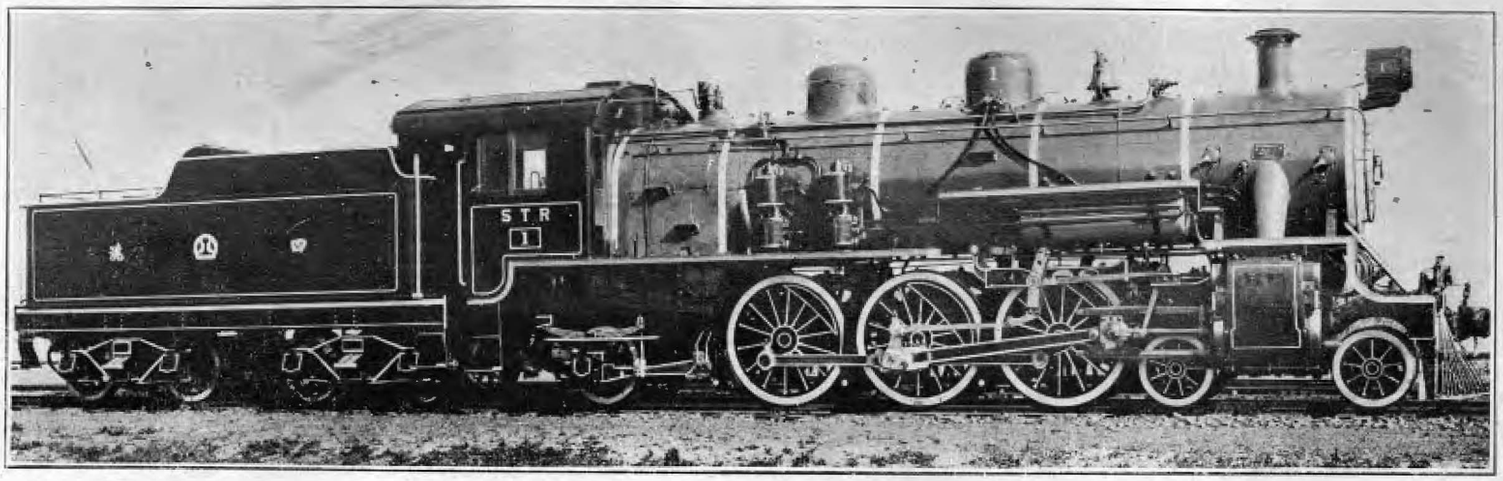

One of Four Pacific Type Locomotives for the Chinese Government Ssupingkai—Taonan Railway Built at S.M.R. Workshops at Dairen

Pacific Type Locomotives for the Ssupingkai-Taonan Railway

Built by the S.M.R. Workshops, Shakakou, Dairen

ONE of the four Pacific Type Locomotives, the order of which was placed last spring with the S.M.R. Workshops, Shakakou, Dairen, was completed on September 26. Upon the technical test of this locomotive in having it run on the line between Ssupingkai and Chengchiatun, by attaching to it a special car, excellent results were obtained, giving the Ssupingkai-Taonan Line authorities great satisfaction. The speed obtained by the trial run reached 80 kilo. hrs.

The first locomotive that was designed and built at the Workshops fifteen years ago is still in use in connection with freight cars. It may be noted in this connection that the approximate weight of this locomotive in working order is 132 gram-tons.

The Workshops have been building 10-20 locomotives a year, most of which have been in use of the South Manchuria Railway. Among the other locomotives which were built at the Workshops, there are 21 which have been used on the Chosen Railways ; three on the railways in Indo-China ; and six have been used by Baitetsu Konsu at Penchihu.

The new locomotive which was designed and built at the workshops has a weight in working order of 135 gram-tons, and the maximum traction power of 12,400 kilogram.

The new locomotive took about four months in the making alone, at a cost of G.Y.75,000.00, which, when the working weight is converted into the empty weight of the locomotive is only G.Y.700.00 per short ton. It may be noted in addition that this new locomotive was designed by utilizing a unique experience of about 20 years in the past on the part of the Workshops in order to adjust it to the local condition of Manchuria.

Specification of Pacific Type Locomotives for Ssupingkai-Taonan Line

(Chinese Government Railways)

Gauge of Track	1,435 m/m. (4-ft. 8½-in.)
Service	Passenger
Diameter of Cylinder	520 m/m.
Piston Stroke	660 ,,
Diameter of Driving Wheel	1,600 ,,
Diameter of Truck Wheel (Leading)	840 ,,
Diameter of Truck Wheel (Trailing)	1,000 ,,
Inside Diameter of Boiler at smallest course	1,600 ,,
Working Pressure	13 kg./sq. c.m.
Length of Fire Box at Grate Surface	2,278 m/m.
Width of Fire Box at Grate Surface	1,580 ,,
Number of Tubes	125
Diameter of Tubes	57 ,,
Number of Flues	22
Diameter of Flues	140 ,,
Length of Tube and Flue	5,500 ,,
Number of Arch Tubes	4 ,,
Diameter of Arch Tubes	76 ,,
Driving Wheel Base	3,400 ,,
Engine Wheel Base	9,300 ,,
Engine and Tender Bases	17,660 ,,
Width of Engine	3,048 ,,
Height of Boiler center line above Rail	2,700 ,,
Approx. Weight in working order :—	
Leading Wheels	16,300 kg.
Driving Wheels	48,600 ,,
Trailing Wheels	16,100 ,,
Engine	81,000 ,,
Tender	52,500 ,,
Weight Empty (Engine)	71,000 ,,
Weight Empty (Tender)	21,000 ,,
Kind of Fuel	Soft coal
Heating Surface :—	
Tubes	172 Sq. m.
Fire Box	17 ,,
Arch Tubes	1.7 ,,
Total	19.7 ,,
Super Heating	44 ,,
Grate Area	3.6 ,,
Grade	1 in 130
Minimum Radius of Curve	500 m.
Water in Tender	22½ Cum. (5,950 U.S.G.)
Coal in Tender	9 tons.
Tractive Force	12,400 kg.
Factor of Adhesion	3.98

TENMA SPINNING CO., LTD., To instal Automatic Looms.—The company has decided to instal automatic devices in its Tenmabashisuzji Mill in Osaka. The automatic attachment will be installed on 500 looms, out of a total of 756 looms. The type to be adopted is Kanai's. (This company is a subsidiary of Toyo Menka K.K.)

NISSHIN SPINNING CO., LTD.—The plan to construct a woollen yarn mill at Gamagori (on the Tokaido Line between Okazaki and Toyohashi) is making a steady progress. The company has unofficially decided to use some Y.2,000,000, out of a new call of Y.2,175,000 due in February next year, for buying the site of the mill in question.

SCRAPPED LOOMS GO TO JAPAN.—It is stated that manufacturers in East Lancashire are selling looms at scrap prices for scrap. The looms being sold are those they found superfluous It is further stated that these looms are being sent to India and Japan, not all of them, of course, but those that are in a fair state of preservation.

JAPAN CHEMICAL INDUSTRY CO., LTD. —The company has succeeded in making a potassium fertilizer by a special process invented after many years of research work. The present productive capacity is rated at some 10,000 tons, but this will be increased to 20,000 tons. Primarily, Japan lacks raw material for this class of chemical fertilizer, and the greater part of the requirements have been imported. Therefore, the extension plan of the company is attracting the attention of the trade.

MEIJI BISCUIT CO.—At the end of 1926 the Meiji Biscuit Co. in Japan put a suction gas plant into service, which supplies the gas for heating the baking ovens. The gas producing plant has been supplied by the firm of Julius Pintsch A.-G., Berlin, the ovens by the firm of Werner and Pfleiderer, Stuttgart. The gas producer is heated with coke aJd produces approx. 400 cu.m. (14.120 cu. ft.) of gas per hour, the coke consumption being about 120 kg. (264 lbs.) German coke was used for the first trials, but Japanese coke is now being fired, which has proved quite satisfactory.

KURIHARA SPINNING AND WEAVING CO., Ltd.—Due to a general depression in the mousselaine market, the smaller manufacturers are considering are unable to follow the policy of the leading companies, plans to change over from mousselaine to woollen yarn.

This company is the first to carry it out, and has completely changed its operations from mousselaine to woollen yarn. Other companies are likely to do the same, such as Kyoritsu Mosurin K.K. Nippon Mosurin K.K., etc. Even the larger companies are expected to take similar measures sooner or later, because production limitation is only a temporary means of alleviating the difficulties.

NEW PARAFFIN FACTORY, OSAKA.—The site for a paraffin plant in connection with the S.M.R. Oil Shale plant, at Fushun, is to located in Osaka, the reasons given being as follow:—

Paraffin having the melting point of 45° or less is taxed at an import port in Japan at the rate of about Y.200 per ton, when exported from China. If manufactured at Fushun or Dairen the S.M.R. Co. would have to pay the very heavy tax. Now the paraffin put out as by-product in the Oil Shale industry has the melting point of 55°. Some oil may be mixed so as to bring down the melting point to 45°, so that it may be imported to Japan duty free. The operation and production costs may run up a little higher at Osaka than at Fushun or Dairen, but in the face of this disadvantage, Osaka is still preferable from a business point of view.

The capital for the new plant is about Y.1,000,000. Work will be started next April or so, that is, after the new Fushun Oil Shale plant is enabled to place its product on the market.

NEW SUGAR CENTRAL PROPOSED, P. I.—The Paniqui Sugar Mills, Inc., proposes to erect a modern mill in Tarlac with a capacity of 1,000 metric tons daily. Some 2,500 hectares of cane land have been pledged. The central will be capitalized at P.400,000.

ORMOC SUGAR COMPANY, INCORPORATED, P. I.—With the incorporation of the Ormoc Sugar Company the island of Leyte will have its first sugar central.

Part of the machinery for the new central has already arrived in Manila from Hawaii while while the rest of the machinery needed to complete the central has been ordered from New York and is due in Manila either in February or in March. The central will have a capapcity of about 300 tons of came daily.

The company has under contract approximately 1,000 hectares of land on which to plant sugar cane and 600 more hectares will soon be added. Planting will begin around January, next year, and it is expected that from 40,000 to 50,000 piculs will be harvested the first year of operation.

The central is capitalized at P.500,000, divided into 5,000 shares at a par value of P.1000 a share. The papers of incorporation show that already P.117,200 has been subscribed.

The incorporators are Ramon Aboitiz, R. Renton Hind, Jose Sy Hong Chuy, E. B. Ford, S. H. Deebel, Martin Geary, Tiburcio Tancinco, Bernardo Torres, and Arsenio N. Luz. The following were elected members of the board of directors: Ramon Aboitiz, A. A. Williamson, C. M. Hudson, R. Renton Hind Jose Sy Hong Chuy, and Manuel Moraza.

The principal offices of the central will be located at Cebu, Cebu.

NEW PHILIPPINE SUGAR CENTRAL STARTS.—The Central Tarlac is now ready for the coming harvest. This mill was erected by the Pacific Commercial Company with machienry purchased from many producers in the United States. The mill is electrically driven will individual control of each mill unit. 300 h.p. motors drive the different units. The milling plant consists of two two-roller crushers and five three-roller mills equipped with individual hydraulic pressure regulators. The boiler room is provided for both oil and bagasse and ample combustion space has been provided. The boiling house is equipped with two eighteen-foot Dorr Clarifiers. All mixers and centrifugals are electrically driven.

A large quadruple effect has been installed which will provide sufficient evaporator capacity to handle juice for any expansion in the central; five of the largest vacuum pans in existence will more than provide graining capacity.

The central is owned by the Compania General de Tabacos de Filipinas. Construction was started in June, 1928. The result has been the erection of the most efficient milling and boiling house installation in the sugar industry. The mill and railroad equipment which consists of 125 kilometres cost some P.6,000,000. The present area devoted to cane is approximately 5,000 hectares.

On account of the small area planted to cane the new central will start operating with a load of approximately 4,000 metric tons of cane daily; within two years, it is believed that 10,000 metric tons will be handled during twenty-fours. Present boiler equipment is 6,856 horse-power; additional equipment will increase this by 175 per cent.

RAILWAYS

LIGHT RAILWAY TO CONNECT TATUNG AND TAIYUAN.—Plans for the construction of the section between Tatung and Taiyuan of the Tatung-Puchow Railway, the north and south trunk Railway line in Shansi, have been completed and work will be commenced in January 1929. According to the plan a light railway will be built in order to save expenses and to enable it to be connected with the Chenting-Taiyuan Railway, which is likewise a light railway.

KEITO RAILWAY TO INCREASE CAPITAL.—At the extraordinary general meeting of shareholders of the Chosen Keito Railway Company held in Tokyo recently, decision was reached to increase its capital by 1,000,000 yen.

BURMA-SIAM RAILWAY.—Burma papers report that the survey work on the Burma—Siam line is to commence next month. Just thirty years ago the suggestion was to connect Moulmein with Bangkok. This was understood to be aligned to come through at the place known as the Three Pagodas and Kanburi. But at that time, save a portion of the line to Korat, Siam had no railways of her own open.

378 PRIVATE RAILWAYS IN JAPAN.—Private railways in Japan, including those to be opened, now total 378 with 6,691 miles and trollies 191 with 2,381 miles, according to the most recent investigation made by the Ministry of Railways. The capitalization for the railway companies is Y.1,563,323,636 and that for the trollies Y.2,118,717,212. The total mileage is 9,073 with the combined capitalization Y.3,682,040,848.

USSURI RAILWAY DEBENTURE.—The Ussuri Line has issued R.30,000,000 Chervonetz debentures to be accepted in payment for freight and other charges from October 1 on the following terms:

Issue price, R.75; R. 10 Chervonetz to be equivalent to $5.15 American, exchange rate with Japanese gold yen to be fixed according to the yen-U.S. dollar exchange rate, as bulletined at the Vladivostock Exchange.

Figuring the dollar exchange rate a $45, R.100 Cherovonetz in face value will be equivalent to G.Y.85.83.

PROJECTED UNDERGROUND RAILWAY IN SEOUL.—A plan for construction of an underground railway in Seoul is now on foot. It is understood that the Chosen Railway Company has applied to the Railway Bureau for permission to construct a subway from Keijo Station to Seiryori, 4.9 miles in length, via Horai-cho, Nandaimon Dori, and Shoro-Dori. It is, however, understood that the railway from Todai-mon to Seiryori will be a surface one. The railway will be of the standard gauge of 4 feet 8 inches, the cost of construction being estimated at 9,300,000 yen.

KYOTO-OSAKA-KOBE RAPID RAILWAY PLAN.—Steady progress is being made for the organisation of rapid transit railway company from Kyoto to Kobe via Osaka.

The new company will be capitalised at Y. 70,000,000, and proposes to lay a line on the shortest distance to connect the three cities, the total length to be 50 miles. The new line will have no stopping places besides Kyoto, Osaka and Kobe stations, covering the whole distance in only 60 minutes, viz:—30 minutes for the distance between Kyoto and Osaka and another 30 minutes for the distance between Osaka and Kobe.

PROJECTED RAILWAYS ALONG KOREAN FRONTIER.—The Government-General of Chosen has drawn up a plan, for a new frontier railway to be called the North Chosen Colonization Railway. It has for its special object the exploitation of the natural resources of the north, and is to connect Shin-Gishu and Keizanchin, taking in Sosan, Manpochin, and Kokai. It will be a light railway with a gauge of 2 feet 6 inches and a length of 650 miles. Construction will cost about 40 million *yen*, the work being spread over 5 to 7 years. The authorities are keen for execution of the project for the reason that it will facilitate the transport of goods in the north, and the exploitation of its forestry, mining, and others resources, consolidate the economic relations between Chosen and Manchuria, strengthen the national defence, and stimulate the migration of people to those parts.